

Indeterminate Liberal Form: Public Space in Sprawl

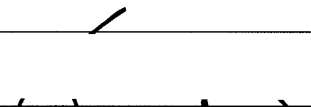
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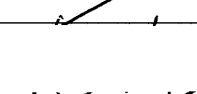
Submitted to the Department of Architecture in Partial Fulfillment of the
Requirements for the Degree of Master of Science in Architecture Studies
at the Massachusetts Institute of Technology, June 2007

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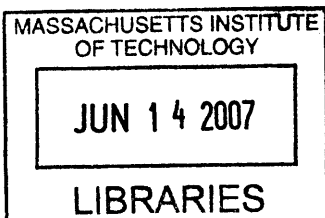
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Indeterminate Liberal Form: Public Space in Sprawl

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Abstract

The question of public space in sprawl is largely ignored, even as sprawl becomes the contemporary reality for more and more of us. This thesis defines a theory of Indeterminate Public Form and proposes the use of computational media to define and enable new forms of public space in sprawl. In addition, this document puts this theory into practice through a speculative architectural design and a physical installation. Both projects use sound as an expressive architectural material, molded and composed with computational technologies. The goal is to demonstrate the ability of computational technologies to create participatory public spaces in less than ideal conditions.

Thesis Supervisor
Terry Knight
Professor of Architecture

Acknowledgements

This project never would have been possible without the guidance and feedback of my advisor Terry Knight and my readers Chris C and Alexander D'Hooghe. You are incredible professors and I feel honored to have worked with you.

I would like to thank the following people for their inspiration, dedication, and friendship: Mom & Pops, Homie aka Michael Rothenberg, Eric Cephalopod Gunther, Justin Manor, Chris Parlato, Dave Small & Mike McKenna & Avi Weinstein, Jeff Lieberman, Jimmy & Kaustuv, Gemma, Ayah, Adam, Kelly, Shifty, Mako, Annina & Alyssa, 02139, The Miracle of Science Bar & Grill, and of course, the Boston Red Sox.

& All my people near and far ... you know who you are

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Fig 1.1
Jacksonville Sprawl

1 Introduction

The pluralist values of a Liberal Democratic society are founded on the acceptance and affirmation of diversity. Public space holds an important place in this society, for it provides a platform for diversity and the perpetual conflict of interest. In a sense it allows for the cultivation of the type of free-thinking, independent citizen required by Liberal society. There is a long tradition of thinking about civic space in the city, but the conditions of sprawl are at odds with this type of public space. This thesis formulates a theory of public space in sprawl and puts that theory into practice through two specific architectural projects.

The theory of Indeterminate Liberal Form posits that computational media has the potential to define and enable new forms of public space compatible with the conditions of sprawl. The first section of this thesis details the philosophical background of the problem of public space in sprawl. This theory is rooted in the Liberal Democratic philosophy of Isaiah Berlin. The role of consumer culture is explored through the work of Theodor Adorno, Jean Baudrillard and the Situationist Guy Debord. From the extreme viewpoint of Debord's Spectacle comes the first techniques for dealing with public space in sprawl: the derive and detournement. Umberto Eco introduces the concept of indeterminacy and the Open Work. The role of the personal narrative is explored through the work Marcel Duchamp. The discussion concludes with an examination of *Learning from Las Vegas* by Venturi Scott Brown. The theory of Indeterminate Liberal Form draws primarily from these thinkers and concepts, and aims to provide a set of techniques and approaches to the problem of the suburban civic core.

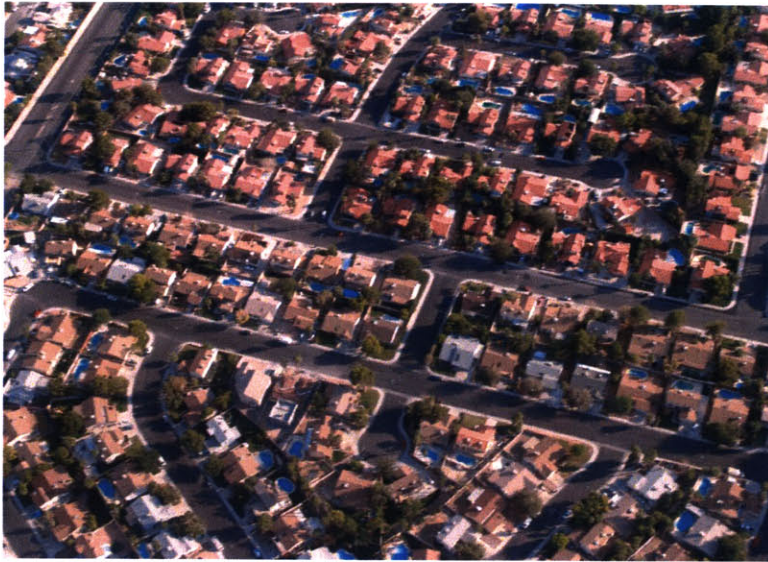


Fig 1.2
Suburbs of Las Vegas

The site of the Natick Mall was chosen for a public space intervention based on the theory of Indeterminate Liberal Form. The roof of a concrete parking structure becomes the stage for a new kind of public park. The horizontal parking surface is partitioned into asphalt and green space and becomes a drive-in park. Piercing this surface are a collection of radio masts which form a three-dimensional audio composition generated in real time. Each mast is recording and playing sounds and samples in networked composition. Human voices in all forms move through the site, becoming atmospheric at times and then crystallizing into legible transmissions.

This project documents the architectural design of the park, and further explores the aesthetics and technical details of such a soundscape through a physical prototype. Eight radio masts were installed into an empty studio space on the MIT campus. A site-specific audio composition was designed and programmed using the same techniques and themes as the rooftop soundscape. The composition was built entirely out of human voice and aimed to achieve a sense of the liberal public sphere in less than ideal conditions. This installation provided a physical example of the theory of Indeterminate Liberal Form, presented alongside the speculative design for the public park.

There are numerous ways one could approach the problem of public space in sprawl. This thesis details just one of these approaches but hopes to raise more general questions about the way we design for Liberal society in times of increasing privatization. The hope is that by providing both an architectural design and a physical prototype, the audience is convinced of the potential of the theory of Indeterminate Liberal Form. The ultimate goal is that this work will provoke numerous theories and designs for suburban civic space.



Fig 2.1.1
The photography of David
Maisel documents sprawl from a
safe distance but demonstrates
the magnitude of the condition

2 Background

2.1 The Contemporary Condition

Sprawl at its extreme is characterized by an almost complete lack of public space. Ribbons of highway and vast plateaus of pavement extend endlessly. They link the personal automobile to a wilderness of private space without horizon. Yet public spaces such as parks and plazas have been part of our communities for thousands of years. This is free space, a necessary component of a free democratic society.

A world without public space threatens the survival of a liberal democracy. As suburban sprawl continues to expand it becomes necessary to address the increasingly private nature of this reality. We can no longer leave these decisions in the hands of commercial interests. As architects and designers, the time has come to develop a theory of public space in this endless landscape of sprawl.

Deyan Sudjic
The Image of the City

"It is true that in this new incarnation the diffuse, sprawling, and endlessly mobile world metropolis is fundamentally different from the city as we have known it. But for the architect to turn their backs on this new form, which is the backdrop to everyday life for the vast majority of people, is both condescending and self-defeating."
[Sudjic p297]

A theory of suburban public space could begin with the ideals of the post-war Urbanists. Late modernist thinkers such as Jose Luis Sert, Sigfried Giedion, and Louis Khan argued in favor of a return to cities when the middle-class population was fleeing en masse to the suburbs. They based their work on the need for a urban civic core: a center of urban life and a staging ground for the democratic exchange of opinion.



Fig 2.1.2
Thomas Weinberger documents
similar conditions in Europe.
Sprawl is a global reality



Sigfried Giedion
The Need for a New
Monumentality

"No civilization has existed which did not fulfill the irrepressible longing for institutions where such a kind of broader life could develop. In different periods these institutions had different aims, but whether they were called the Greek gymnasium, the agora, the Roman thermae or fora, the guilds, the medieval market places or cathedrals, they all contributed in developing human values. These institutions were never conceived of as financial investments. Their function was not to produce money or to bolster a waning trade." [Giedion p55]

The modernist goal was to create a platform for the perpetual conflict of interest, a pluralist space in the city. There was a sense that the design and planning of cities could foster a diversity of opinion, could encourage political involvement, and could protect against the tyranny of the majority. In more recent times, we have witnessed a return to the cities, but not in quite the same way it was envisioned by these Urbanists. Instead of civic cores, we have commercial cores, beautiful urban shopping districts, yet private spaces with restricted access. We are entering an era where both urban and suburban space are characterized by privatization. Neither city nor suburb seems free from commercial interests. Advertising overwhelms city and suburb alike.

If cities are becoming urban shopping malls, the distinction between city and suburb is less significant than we initially thought. We could instead focus on the nature and quality of public space in both of these locations. Using these two dimensions of urban/suburban and public/private we can examine a number of type of space: urban civic and commercial cores, suburban commercial cores, suburban commercial strips and suburban sprawl. Still, a sixth space is missing, the suburban civic core. Can we find a way to define civic space in the suburbs? A theory of public space in sprawl is essentially a theory of this suburban civic core.

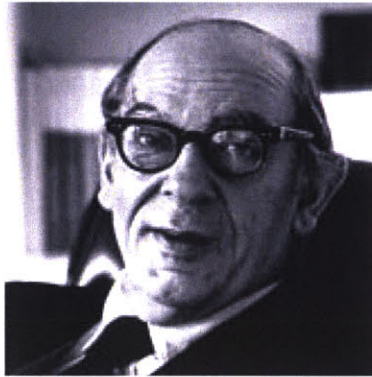


Fig 2.1.2
Figures of the Counter-
Enlightenment and their
champion. Clockwise from
upper left: Berlin, Machiavelli,
Vico and Herder



2.2 Philosophical and Aesthetic Approaches to Sprawl

2.2.1 Pluralism and the Liberal Democracy

The acceptance and affirmation of diversity is the cornerstone of democracy. Pluralism is generally understood as the belief in the constructive power of diversity. Isaiah Berlin, a committed and outspoken Pluralist thinker, devoted most of his intellectual career to the promotion of historical figures who advocated these views. Many of these figures were responding directly to the Enlightenment belief in absolutes. Closely linked with the scholars of the Scientific Revolution, Enlightenment thinkers aimed to establish a universal system of government, logic and aesthetics through Reason. "The new method sought to eliminate everything that could not be justified by the systematic use of rational methods, above all the fictions of the metaphysicians, the mystics, the poets..." [Berlin, p 84] Berlin, and the scholars he championed, argued that there might not be a single solution or set of beliefs that should govern man. Instead, each culture and epoch might have its own solution, perfect for their contemporary condition, but utterly incompatible with other cultures or eras. These thinkers rejected the idea of absolute truths and a perfect society founded upon them.

The German Romantics, Machiavelli, and the Neapolitan philosopher Giambattista Vico, were some of the figures that Berlin felt represented ideas counter to the Enlightenment. In general, this philosophy argues for the admission of conflicting viewpoints. In Berlin's eyes, such an acceptance was the cornerstone of Liberal Democratic society. By exposing historical figures in this light, he emphasized that the Liberal tradition was in historical opposition to the Enlightenment belief in the Universal. Berlin describes this in relation to Vico:

"His revolutionary move is to have denied the doctrine of a timeless natural law the truths of which could have been known in principle to any man, at any time, anywhere. Vico boldly denied this doctrine, which has formed the heart of western tradition from Aristotle to our own day." [Berlin p5]

Berlin searched through history to find figures of the Counter Enlightenment, for he saw the affirmation of diversity as a foundation of toleration and peace. "Toleration is historically the product of the realization of the irreconcilability of equally dogmatic faiths, and the practical improbability of complete victory of one over the other." [Berlin p78] One of the first step in the creation a tolerant society is the admission that there might be viewpoints other than one's own that are equally valid. When we finally accept that a diversity opinion can exist in parallel, even if these opinions seem incompatible, we allow for Liberal Democracy.

The Urban Designers had this in mind when they emphasized the need for the civic core. Their goal was to create a stage for pluralism in the cities, an urban platform for the perpetual conflict of interest. Many of these architects and planners were responding to the totalitarian states that had engulfed Europe until the end of the Second World War. These architects fled Europe of the 1930s and 40s and emphasized the need for architecture to preserve and promote the values of Liberal Democracy. Their work was rooted in the thinking of Isaiah Berlin and the acceptance and affirmation of diversity.

2.2.2 The Commodification of Culture

The critical theorist Theodor Adorno, a seminal figure from the Frankfurt School, argued that the role of culture is to question the values of society. To blindly accept those values, on the other hand, is to reinforce society's flaws. He saw the rise of commodities and popular culture as a grave threat to personal liberty. Adorno called this the Culture Industry, an industry manufacturing ideas and opinions that encourage complacency. In Adorno's opinion culture was incompatible with the industries of consumption; there was no such thing as popular culture or mass culture.

"Culture, in the true sense, did not simply accommodate itself to human beings; but it always simultaneously raised a protest against the petrified relations under which they lived, thereby honouring them. In so far as culture becomes wholly assimilated to and integrated in those petrified relations, human beings are once more debased."
[Adorno p100]

Private commercial space is designed for the consumption of entertainment and commodity. In Adorno's view, this space threatens our freedom. The Culture Industry emphasizes homogeneous consumers, reifies stereotypes, and suffocates all opposing voices. Any idea that threatens the exchange value of good threatens the whole of the infrastructure of commodities. Therefore, the only information that reaches the consumer seeks to protect the commercial interests that define the information in the first place.

"However useful it might be from a practical point of view to have as much information as possible at one's disposal, there still prevails the iron law that the information in question shall never touch the essential, shall never degenerate into thought. This is ensured by the restriction of information to what the monopoly has supplied, to commodities, or to those people whose function in the business world has turned them into commodities." [Adorno p84]



Fig 2.2.1
Prada Stone, Tokyo
Herzog & de Meuron's
architectural contribution
to the culture of
consumption



Fig 2.2.2
A convenience store in
suburbia: concentration
of the Culture Industry

Most importantly, the Culture Industry is a barrier to liberal democracy. It functions in the opposite way as the civic core, eliminating discussion and choice. It saturates the population with commodities in order to keep them in a passive state of consumption. "It impedes the development of autonomous, independent individuals who judge and decide consciously for themselves. These, however, would be the precondition for a democratic society which needs adults who have come of age in order to sustain itself and develop." [Adorno p106]
A liberal democracy is predicated on access to truthful information and protection of minority opinions. It requires space that is free from the homogenizing influences of the Culture Industry. This is true of all communities: urban, suburban, and rural. As stated previously, an important aspect of the project of Urban Design was the creation of urban centers that would serve as stages for the expression of idea and opinion. Adorno would argue that commercial space cannot serve this purpose for it seeks to exclude anything seen as a barrier to consumption.

The visual language of consumption has been called the Image Economy and is closely linked to an understanding of Sign and Signification. Jean Baudrillard explored these ideas extensively in his work, "For a Critique of the Political Economy of the Sign." He viewed commercial objects as signals of social status, employed in a way that reifies class distinctions. Objects were not used or enjoyed, but were a social institution, restricting the owner to a fixed place in society. At one extreme is a portion of the population doomed to chase after material goods.

"It must be asked whether certain classes are not consecrated to finding salvation in objects, consecrated to a social destiny of consumption and thus assigned to a slave morality (enjoyment, immorality, irresponsibility) as opposed to a master morality (responsibility and power). Such are the heirs of the servile, subaltern classes, or of courtesans dedicated to 'paraphernalia.'"
[Baudrillard p62]

Here consumption is viewed as a hidden method of social stratification. Goods serve to remind us of our position in society and frustrate our attempts at social mobility. Again, it seems that public space is at odds with commercial space. Baudrillard extended this theory from consumer goods to mass media, and argued that both serve the same purpose: "to keep everyone in a certain place." Although extreme, this is an important theory to consider when designing for sprawl. Techniques for creating public space in a world of consumption should address the possibility that consumer culture is designed to reduce social mobility.



Fig 2.2.3
Cover of Guy Debord's
Society of the Spectacle

2.2.3 The Spectacle and Situationist Urbanism

The Situationists, especially Guy Debord, took the ideas of Culture Industry and Image Economy a step further, but also developed some powerful tools for responding to these conditions. Debord characterized contemporary society as the Spectacle, a false reality defined by the dominant modes of production. The Spectacle had managed to envelope all of society in such a way that we can no longer find reality. In his view, there is nothing that reaches the consumer that isn't part of the spectacle.

"Understood in its totality, the spectacle is both the outcome and the goal of the dominant mode of production. It is not something added to the real world - not a decorative element so to speak. On the contrary, it is the very heart of society's unreality. In all its specific manifestations - news or propaganda, advertising, or the actual consumption of entertainment - the spectacle epitomizes the prevailing model of social life. It is the omnipresent celebration of a choice already made in the sphere of production, and the consummate result of that choice. In form as in content the spectacle serves as total justification for the conditions and aims of the existing system. It further ensures the permanent presence of that justification, for it governs almost all time spent outside the production process itself." [Debord p13]

On its own, this philosophy is paralyzing, but Debord and the Situationists offered a number of aesthetic practices for countering the Spectacle. The first of these is the derive, an immersive wandering through the city, where the person on a derive entirely gives themselves up to the qualities of space in which they find themselves. The goal is to experience the city beyond the boundaries of neighborhood, street, or any other conventional element of urban design. If all these physical aspects of the city represent the Spectacle, then it is up to the individual on a derive to discover the true Psychogeography of the city.

"By virtue of the resulting mobile space of play, and by virtue of freely chosen variations in the rules of the game, the independence of places will be rediscovered without any new exclusive tie to the soil, and thus too the authentic journey will be restored to us, along with authentic life understood as a journey containing its whole meaning within itself."
[Debord p126]

The second Situationist technique we will consider is *detournement*, the reuse of existing artistic material in new works of art. Similar to collage or the more contemporary remix, the idea is to incorporate previous material into new aesthetic compositions. Objects of consumption, or those defined by the dominant modes of production, are seen in a new context and serve to expose the industries of consumption. The Situationists had a playful way of drawing from the Spectacle in order to fight it. Situationist Urbanism was tied to the social, and aimed to confront the rising isolation of the suburbs.

"Our concept of urbanism is thus a social one. We are opposed to the concept of a garden city, where space and isolated skyscrapers must necessarily reduce direct relations among people and their common action. For close relations between surroundings and behavior to be produced, agglomeration is indispensable. Those who think that the rapidity with which we move around and the possibility of telecommunications are going to dissolve the common life of agglomerations have little idea of humanity's true needs."
[Constant, in McDonough p96]

The Situationists provide us with useful techniques for dealing with public space in sprawl. The conditions exposed in *The Society of the Spectacle* are at their most extreme in locations devoted to consumption, and thus the *derive* and *detournement* become especially relevant precedents for addressing civic space in these extreme locations. These techniques will become part of the theory of Indeterminate Liberal Form.

2.2.4 Indeterminacy

Many contemporary works of art can be characterized by their use of indeterminacy. This trend was explored by Umberto Eco in his book *The Open Work*, and much of this research can be condensed into a general aesthetic technique for responding to the Culture Industry. The development of the Open Work coincided with scientific advancements in both physics and information theory that stressed probability as opposed to certainty. These works of art incorporate controlled indeterminacy into their creation and performance. Both the rules governing the composition, as well as the way the artist applies the rules to compose the piece, are flexible. This leads to many potential readings as opposed to a single, fixed way of looking at a composition.

"The notion of 'field' is provided by physics and implies a revised vision of the classic relationship posited between cause and effect as a rigid, one-dimensional system: now a complex interplay of motive forces is envisaged, a configuration of possible events, a complete dynamism of structure." [Eco p14]

Many mediums can be matched to indeterminacy, but computational media is especially well-suited to these ideas. Programmed compositions can be based on any number of probabilities. The author of a computational artwork can define the range of possibilities and leave certain key aspects of the composition open to chance. They can even generate chance or entropy as an internal element of the composition using algorithms such as random number generators, noise functions, stochastic processes, and Markov chains. Eco would argue that the role of the artist is to define the boundaries in which the work can oscillate.

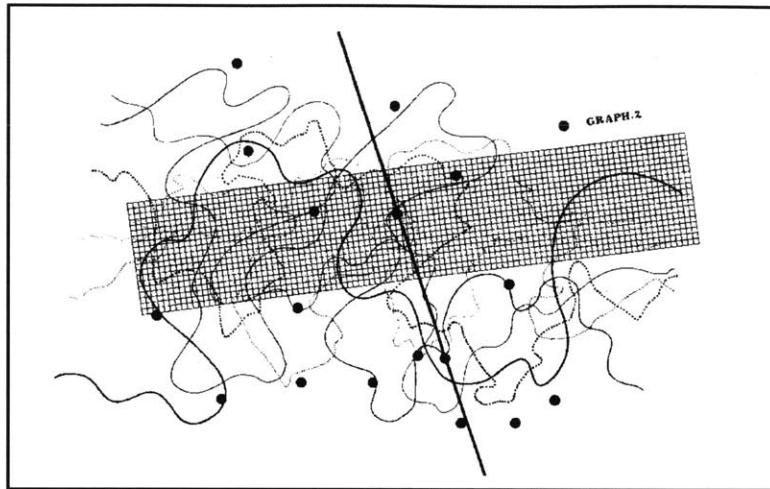


Fig 2.2.4
John Cage
Fontana Score
A layering of celestial
phenomena becomes the score
for a musical performance.

"In fact, one might say that rather than imposing a new system, contemporary art constantly oscillates between the rejection of the traditional linguistic system and its preservation - for if contemporary art imposed a totally new linguistic system, then its discourse would cease to be communicable. The dialect between form and the possibility of multiple meanings, which constitutes the very essence of the 'open work,' takes place in this oscillation." [Eco p60]

Indeterminacy is an appropriate response to the Culture Industry because it resists homogenization and fixed readings. Providing a field of possibilities is a direct response to the totalitarian scheme of consumer culture. The artwork cannot be controlled, it can only be contained within a range. Like the Situationist techniques of derive and detournement, indeterminacy argues for a personal reading of space.

2.2.5 Duchamp and the Personal Narrative

Marcel Duchamp was one of the first artists to explore the relationship between consumer culture and art, and his work argued for the personal narrative long before the Situationists. When Duchamp rotated a urinal ninety degrees, placed it on a plinth, and titled his piece "Fountain" he crossed the divide between commodity and culture and defined art as a conversation involving an audience. The personal narrative of the audience became an aspect of the artwork. Before Duchamp, the artist worked alone in his studio and presented his art as something final. Fountain was a dialogue between artwork and audience. His sculptures pose the questions, but he refuses to answer them.

"Duchamp's strategy has been to present a work which is irreducible under formal analysis, which is detached from his own personal feelings, and for which there is no resolution of one's efforts to decode or understand it. His work is not intended to hold the object up for examination, but to scrutinize the act of aesthetic transformation itself." [Krauss, p80]

Duchamp takes the bold step of separating his personal dogma from the artwork. Although we still see this piece as a creation of Duchamp, we cannot read it in the same way as previous sculpture. The work requires a personal reading. Similar to the values of the Counter Enlightenment, it stands in opposition to a single, rational system of understanding. Through his sculpture, Duchamp argued for a multiplicity of interpretations and viewpoints. The fixed narrative was replaced by the potentially endless personal narratives of the audience.



Fig 2.2.5
Examples of Marcel
Duchamp's readymades.
On the left is Bottle Rack,
on the right is Bicycle
Wheel, and below is the
iconic Fountain.



The Fountain was the first in a number of “readymades.” Duchamp would purchase a product, such a shovel or bottle rack, and install it in a gallery. He was not arguing that commodity was culture, but rather that culture was an ever-changing dialogue involving the artists, their art, and the audience.

2.2.6 Unlearning Las Vegas

The work of Robert Venturi, Denise Scott Brown, and their students at Yale, *Learning from Las Vegas*, focuses on the analysis and understanding of the suburban commercial strip at its most extreme. These theorists see a playfulness, a vitality, and a beauty in the vulgar and commercial architecture of the Las Vegas strip. They argue for an architecture of inclusion. Most importantly, they approach the suburban commercial strip with the critical rigor of an architectural historian. To them, the strip presents the contemporary-in-practice. It is built form, the physical manifestation of the contemporary condition.

"The commercial strip within the urban sprawl is, of course, Broadacre City with a difference. Broadacre City's easy, motival order identified and unified its vast spaces and separate buildings at the scale of the omnipotent automobile. Each building, without doubt, was to be designed by the Master or by his Taliesin Fellowship, with no room for honky-tonk improvisations. An easy control would be exercised over similar elements within the universal, Usonian vocabulary to the exclusion, certainly, of commercial vulgarities. But the order of the Strip includes; it includes at all levels, from the mixture of seemingly incongruous land uses to the mixture of seemingly incongruous advertising media plus a system of neo-Organic or neo-Wrightian restaurant motifs in Walnut Formica." [Venturi Scott Brown pp52-3]



Fig 2.2.4
Las Vegas Strip 1970s
Architecture of exclusion

Venturi and Scott Brown see the strip as a pluralist space. In their opinion, it is free from the tyranny of the architectural elite, free to include all types of building types and functions. In reality, the strip is pure spectacle. The problem is that all these seemingly diverse design elements, from the Shell sign to the reproduction of Venus De Milo, have the same commercial origin. Is this really an architecture of inclusion when every element serves a commercial purpose? In fact, there is no choice here, because everything is already chosen. What might seem like pluralist space reveals itself as totalitarian. The Spectacle is the only viewpoint represented, it envelops everything.

Venturi and Scott Brown equate the cultural and commercial. Unlike Duchamp, who placed the commercial in a position where the audience could question it, they embrace the commercial and encourage the audience to do so as well. This was a radical move at the time, and although it aimed to question the established hierarchies within the profession, it failed to grasp the consequences of its argument. The suburban commercial strip is just another absolute, it isn't an architecture of inclusion. It might contain a formal and visual diversity of components, but it is homogeneous space all the same.

2.3 Formal Conditions of Sprawl

Edward W. Soja
Designing the
Postmetropolis

"The dominant central city represented urbanism as a way of life, filled with excitement, heterogeneity, culture and entertainment, skyscrapers, and industry, as well as crime, grittiness, drugs, and poverty. In contrast, there was suburbia, with its uniformity, open spaces, detached homes, automobile-based lifestyles, relative boredom, soccer moms, commuting breadwinners, cul-de-sacs, and such political and cultural power as to define the U.S. (pace Andres Duany) as a "suburban nation." Over the past half century, however, there has been an extraordinary intermixture of these two worlds, creating a growing recognition that traditional definitions of the city and urban-suburban life need a major rethinking." [Soja p47]

2.3.1 Access

Returning to our discussion of cities and sprawl, we will look at a number of characteristics that define the two types of space. The first of these is access and the automobile. In the city, there are a number of methods of access and modes of transportation. Many individuals thrive in cities without ever owning a car. In sprawl, however, access is almost exclusively restricted to the personal automobile. Public transportation options are so limited that they are irrelevant. Travel is done by car, with individuals or families isolated in their personal vehicles.

"The only good choice for most suburbanites is to drive, and to drive a lot. And that is exactly what we are doing. Motor vehicle use in America doubled from one to two trillion miles per year between 1970 and 1990. In the 1980s, vehicle miles traveled grew more than four times faster than the driving-age population and many times faster than the population at large. There are many reasons for this surge in driving, but a growing body of research makes it increasingly clear that sprawl comprises a large portion of the problem: people in spread-out locations drive more." [from Paving Paradise, Sprawl and the Environment]

Cities have a diversity of access and a corresponding diversity of use based on this access. They must operate at a number of scales and speeds. Their streets are public and their plazas are open, whether in the mid-afternoon or middle of the night. On the other hand, the use of sprawl is homogenized by its single mode of access. The vast majority of these sites contain a parking lot and a container of private program. The personal automobile is an important aspect of urban life, but it is a requirement in sprawl. This immediately serves as a filter, preventing certain types of use and limiting the public possibilities of the space.

The parking lot is the zone of transition from the scale of the automobile to the human scale. In fact, outside of a defined park, the parking lot is the closest thing to public space in sprawl. Is it open to the environment, and although guarded by security vehicles, often open at all hours, even when the stores are closed. The parking lot sits between the isolation of the personal car and the container of commercial retail space. Once inside the container, space is completely regulated towards consumption.

Experience

2.3.2

Urban sites are experienced at numerous speeds and scales. They are bounded by the surrounding urban fabric and experienced within this context. Monuments and buildings may extend vertically and be seen from beyond their immediate site as well. These locations may be arrived at with by number of modes of transportation. Each mode has its own scale and speed, from the human to the airplane. Eventually the architectural details shift down to the human scale. Sprawl, on the other hand, is experienced from greater distances and at greater speed. The highway is often the only means of arriving at these sites. The construction and design is based around the speed of the automobile and there are no exterior details at the human scale. Huge signs advertise vast warehouse spaces situated in expansive parking lots. As the consumer exits their automobile and enters into the commercial space, the architectural details transition to the human scale, but again, this is only within the private context of the site.

Urban sites are by nature embedded within the fabric of the city. This woven fabric includes major transit nodes and a number of internal connections: roads, rail, walkways, canals, and parks to name a few. There are both lines and nodes connecting those lines. Buildings are linked to their neighbors in any number of directions. On the other hand, sprawl is defined by long linear connections without nodes: highways or the Strip. This linear system seems to repeat endlessly and lacks legibility. The distance between buildings is too vast to link one to its neighbors, instead there is only a repetition of disconnection.

In conditions of extreme sprawl, the image repeats itself in all directions. There is no interconnection, no boundary, no horizon. This is illegible space. Each site exists as a singularity, without scale, orientation or context. Without a point of reference, you can be in perpetual motion and yet never feel like you're moving. Everything appears exactly as did a moment ago, even though you are crossing the landscape at great speed.

2.3.3 Urban Suburban

The conditions of sprawl are not unique to the suburbs. In fact, many elements of sprawl have been reinserted into the cities. Much of contemporary urbanism is concerned with defining consumer centers in the city. These urban shopping malls function almost exactly like sprawl retail, but they do allow for a diversity of access, and are experienced at numerous speeds and scales.

"To be more specific: in most revitalized or new American urban nodes (e.g., "lifestyle centers"), one can shop in stores with good and interesting merchandise, enjoy a sophisticated meal, find amusements like movies, stroll outdoors in clean and tastefully decorated parks and streets, and end up comfortable and content under a street tree sipping cappuccino. And this is certainly a big step up from being surrounded by cars, street-level blank walls, surface parking lots, huge empty plazas, and office towers. But do the comfortable passive pleasures of cappuccino urbanism suggest anything but a tiny portion of a life well lived?" [Saunders p3]

The goal of this thesis is to address the need for public space in sprawl. Because so much of sprawl is defined by private retail, an approach to suburban civic space must respond to the dominant material culture. This is not to say that the problem doesn't exist in urban centers as well. Indeed the rise of private space can be seen in cities as well as suburbs. The view of this work is that the problems of public space in sprawl are largely ignored. This is not a criticism of suburban life but rather an analysis of the conditions of sprawl so that the design theory can be matched to the actual realities of the environment.

2.4 The Civic Core: Two Case Studies

The Urban Design program was centered around the desire for the Urban Civic Core. Many of these visionary works were eventually regarded as failures, and the modernist project for the Civic Core was abandoned. This thesis explores the roles of these ideas in sprawl conditions, so it becomes important to look at the actual architectural designs from this era. I will examine the successes and failures of two of these projects with the goal of applying this analysis to a theory of Indeterminate Liberal Form.

2.4.1 Shinjuku Master Plan, Fumihiko Maki, 1960

The late modernists stressed the civic core as an ideal of urbanization. Although we do find examples of this typology, we also find many examples of its spectacular cousin, the urban commercial core. Fumihiko Maki's plan for the redevelopment of Shinjuku, Tokyo can be seen as an example of an indeterminate urban commercial core. Only a few sketches and photographs of models remain, but in both word and image, Maki emphasizes the indeterminacy and openness of his design.

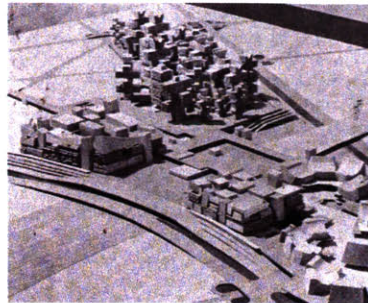
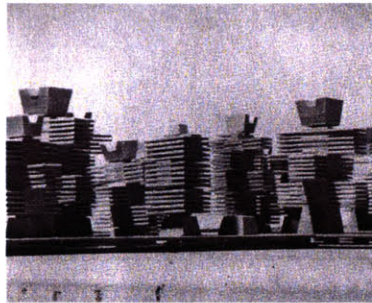


Fig 2.4.1
Fumihiko Maki
Shinjuku Master Plan
Model, 1960



Maki's design transforms the Shinjuku site, bound by highway on all sides, into an enormous platform for urban commercial activity. From a major rail and subway station radiate three zones of urban activity, one for shopping, one for entertainment, and one for business. Each zone is a composition of multiple buildings, formally based on the interaction of these volumes and their interstitial spaces. Maki believes that the open quality of the design enables flexibility and allows for previously unimaginable use, while at the same time provides coherence and stability. "The ideal is not a system ... in which the physical structure of the city is at the mercy of unpredictable change. The ideal is a kind of master form which can move into ever new states of equilibrium and yet maintain a visual consistency and a sense of continuing order in the long run." [Maki, p11] Each zone is described as a template, an ordering principle, rather than a fixed design. In fact, in each illustration or model that survives of this project, the zones are rendered differently. All examples follow the principles outlined by Maki, but each offers a different interpretation of these principles. Maki also stresses that each zone contains buildings designed by a number of architects, each building obeying the design principles of the zone, but open to formal interpretation.

This urban site centers around the major transportation node of the train station, and connects directly to the highway network with a number of clover leaf exchanges. It is bound by these existing infrastructural conditions, but is not linked to the surrounding urban fabric. The platform functions as island within the city. Maki erases the existing neighborhood with his design, and largely ignores the local context of the project. The vastness and isolation of this platform do in some ways resemble sprawl. The train station, however, gives the entire metropolis access to the site, and the monumental built form lend the design a legibility at a number of scales and speeds. Maki emphasizes the need for human scale in the city, and his plan reaches down to the human scale. In many ways, his plan is a template for human-centered design at the scale of sprawl.

"When a plethora of stimuli begins to divert us from receptive consciousness, the city renders us insensible. Then, in our inability to order experience, we suffer the city, and long for some adequate means to comprehend it as the product of men like ourselves - as the product of an intelligent, ordering force. If the scientist is frustrated when the order or pattern of a phenomena is too fleeting for him to observe, or too complex to recognize with extant tools, so is the city dweller frustrated when he cannot find human order in his environment. At those moments when he sees only the results of mechanical and economic processes controlling the form and feel of his place, he must feel estranged, and outside." [Maki p29]

The three zones each have their own function, but none are civic in nature. Maki's plan is based on the modernist ideal of liberal form, but applied to the urban commercial core. The plan is pure spectacle. Today we see numerous urban redevelopment projects based on the urban shopping mall. Although these projects are effective at bringing certain groups of people into the city, they don't function as true centers of urban life. Like any shopping mall, they are characterized by private property and limited access. In Maki's plan we see this to. The plan excluded the surrounding city. The train station and highway exchanges function as controlled gates to the site, and the highway itself acts as a wall, guarding the platform from the local context. At best, the indeterminate nature of the plan could allow for an unforeseen civic component. In the end, the project suffers from this limitation. As much as Maki speaks of the liberal ideals of the Urbanists, his design fails to explicitly call for a civic core.

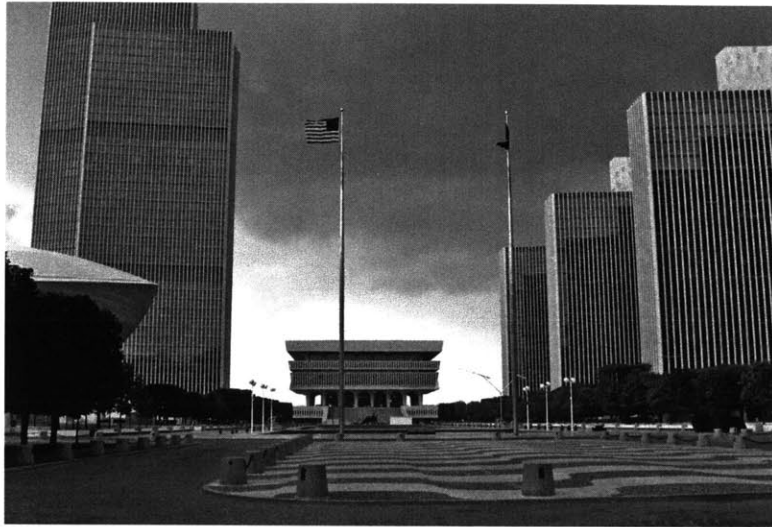


Fig 2.4.2
Harrison and Abramovitz
Empire State Plaza

2.4.2 Empire State Plaza, Harrison & Abramovitz, 1965-1978

The Harrison and Abramovitz design for the Empire State Plaza incorporates many of the ideals of liberal pluralist form. A vast platform is populated with a number of buildings, diverse in form, each with a civic purpose. This is the seat of the New York State government in Albany. Government towers, a library and state archives, and a dramatic concert hall surround a series of three reflecting pools. The platform itself is actually an immense volume, and an urban commercial core in its own right. In this design, the civic sits directly above the commercial.

The project has been inserted into the city in dramatic fashion. The construction of the Plaza displaced a huge number of inhabitants and erased an entire neighborhood. As much as the designers stressed the participatory nature of the site, the project is isolated from the rest of the city, towering above it from three sides. The Plaza is surrounded with highway infrastructure much like a suburban project inserted on top of the urban condition. Additionally, this project has been criticized for the way it imposed its democratic vision on the city in a totalitarian fashion. Was this an expression of the power of diversity, or the vision of a megalomaniac, ironically designed in the language of the civic core?

"To provide a plausible alibi for this monumental burst of construction, Rockefeller claimed it was all being done in the name of civic improvement. According to Rockefeller, Albany's center was in danger of being overwhelmed by a threatening wave of slums that supposedly lapped at the gates of the governor's mansion. In fact, 6,000 people lost their perfectly adequate homes, demolished to make way for the plaza, destroying a stable middle-class community and, if anything, worsening the plight of the city's fragile center." [Sudjic p190]

Most importantly, the Plaza itself often sits idle, while the commercial core is filled with people, a center of activity. In order for the Plaza to come alive, the city artificially inserts program in the form of entertainment and consumption. Concerts, open air markets and fireworks bring life energy to the space and the Plaza teems with urban life. The commercial core of the project, on the other hand, is always active. It serves as a linkage between parking and the multiple government buildings and provides a number of services for the state employees. The problem lies in the extreme separation between the commercial core and the Civic Core that sits above it. From within the drab confines of the commercial volume there are no indications of the monumental forms above. Furthermore, the entire project is isolated from the city. This isolation diminishes the pluralist power of the project. The plaza and its buildings stand apart from the people, and seem only to function for a select few. It could serve as a venue for the perpetual conflict of interest, but it stands empty unless the city artificially injects energy onto the site.

2.5 The Theory of Indeterminate Liberal Form

Architects and Urbanists have been able to create exceptional commercial spaces in the cities and suburbs. From the urban core to the suburban strip, the spectacle of entertainment and shopping brings people, energy, and excitement to a number of sites. People have been moving back to the cities, but successful spaces within the city are still private retail and entertainment. The lack of free public space is even more pronounced in sprawl. Our examination of civic cores showed that they are often under-utilized when they do exist. As much as we can argue for such spaces, existing examples are often neglected. They are too lifeless, too far removed from our daily needs. Perhaps we can embrace the language of the Culture Industry while resisting the commercial interests that currently control it.

Our approach to the suburban civic core is called Indeterminate Liberal Form.

Indeterminacy

Is a technique that can liberate the aesthetics of the Spectacle from the control of the industries of consumption. The language of commodity is used to animate public space. Aspects of the design are left open in order to resist homogenizing influences.

Liberal

Stands for the perpetual conflict of interest and exposure to diversity of ideas and opinion. The ultimate goal is to design public space that allows for personal freedom.

Indeterminate Liberal Form

Is the use of computation media to define and enable public space. The language of the Spectacle can be appropriated by the designer to create participatory public spaces: platforms for the perpetual conflict of interest. These spaces resist totalizing schemes and remain open to the personal narrative.



Fig 2.5.1
Empire State Plaza meets the
Spectacle. This image hints at
the theory of Indeterminate
Liberal Form.

*"If indeed the advances of technology largely determine the fate of society, then the technicized forms of modern consciousness are also heralds of that fate. They transform culture into a total lie, but this untruth confesses the truth about the socio-economic base with which it has now become identical. The neon signs which hang over our cities and outshine the natural light of the night with their own are comets presaging the natural disaster of society, its frozen death. Yet they do not come from the sky. They are controlled from the earth."
[Adorno p96]*

Can we make Spectacle out of the Liberal public sphere? This seems to be the challenge of public space for cities and well as sprawl. We rarely have difficulty designing successful entertainment spaces. Indeterminacy is a technique that can allow us to borrow from the aesthetics of the Spectacle in order to define and enable new forms of public space. This is the mission of the suburban civic core.

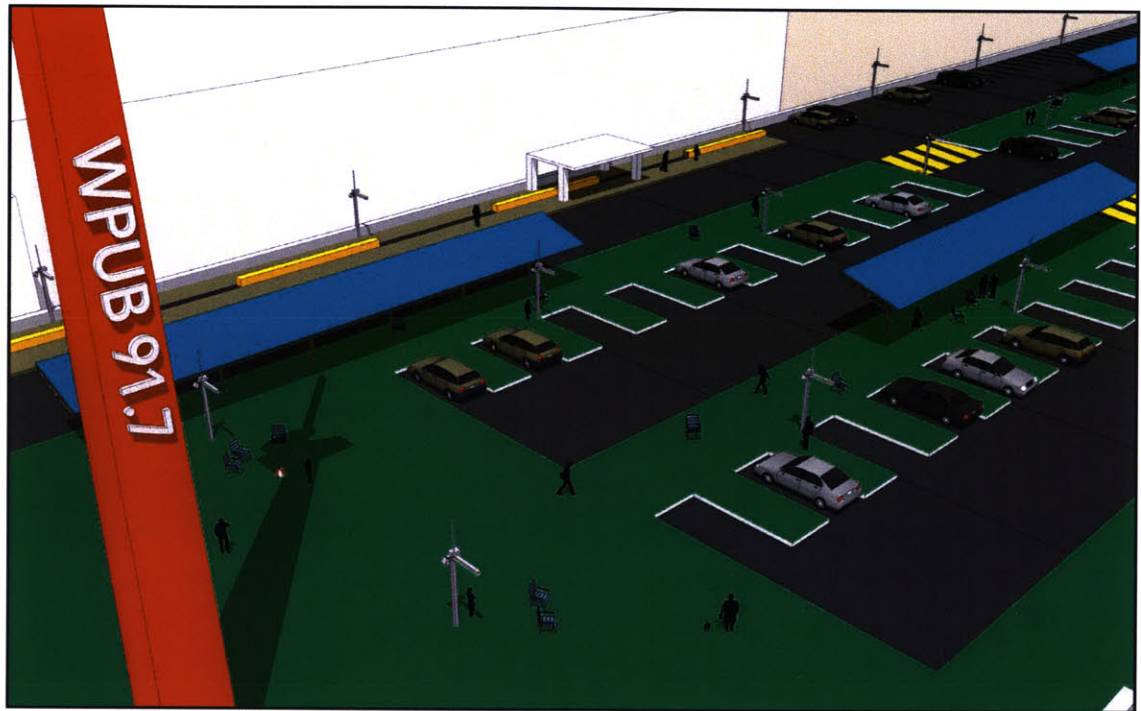


Fig 3.1.1
Aerial View of the
architectural intervention

3 Architectural Intervention

This section explores a specific architectural design founded upon the theory of Indeterminate Liberal Form. The design and planning of a public park is seen through the lens of this theory. Computational media becomes an essential component in the architectural project.

The project itself is a park set on the roof a parking structure at the Natick Mall in Massachusetts. The final design is based on a number of design criteria specific to the suburban civic core. The site was selected to be an extreme example of sprawl, and therefore, far from ideal for a public space project. If the ideas contained in this thesis are valid, they should be able to provide direction for such a design challenge.

The computational hardware included in the project will be further detailed and explained. A prototype of the architectural hardware was design, programmed, and installed in a space on the MIT campus. A detailed explanation of this installation will follow in the next section. Whereas the design of the park was purely speculative, the design of the hardware was advanced to a working physical prototype.

3.1 Final Design Criteria

Sign & Spectacle

At a macro level, the project should function as a form of signage at a scale that allows it to be seen from a great distance. The goal of this large gesture is to direct people to the site and orient people within sprawl. The project should function as a node within the linear expanse of sprawl. The project will borrow from the energy of consumer culture and become a kind of Liberal Spectacle.

Pluralist

The visitor is drawn to the project by its spectacle and energy, but once they arrive, they will encounter a diversity of opinion and viewpoint, some unpleasant. This project aims to capture the contemporary reality of the local and global communities and present them to the visitor. The desire is to provide a forum for the perpetual conflict of interest. These discussions can be between visitors or between the visitor and society at large.

Participatory & Personal

The intervention should encourage personal involvement in the project, where users can choose to participate. At the same time, the project shouldn't overwhelm the space to the point where it becomes inhospitable to other uses. The project should allow for participation with requiring it.

An alternative to private commercial space

It is likely that the project needs to be a compromise between public and private space. Without some kind of governmental action, it is unreasonable to assume that there can be completely public, open, free space within a world of retail development. In order to bring aspects of public space to this location, there will be limits to the freedom of the project, but the hope is that the techniques of Indeterminacy can guarantee a certain amount of freedom. In addition, by placing the project outdoors, it is less likely to become controlled consumer space.



Fig 3.2.1
Site at the regional scale:
metropolitan Boston is to
the East via I-90

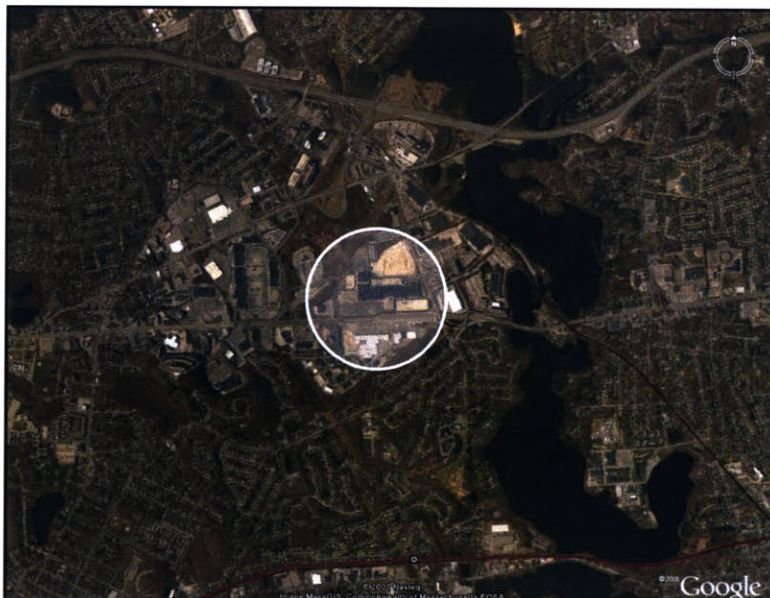


Fig 3.2.2
Site at the local scale:
The mall is situated
on Route 9, a half mile
South of I-90 in the midst
of expansive sprawl
development

3.2 Site and Situation

"The work was officially completed on November 17, 2006, when the mall held a grand reopening celebration. In the process of renovating, the word "Mall" was also dropped from all official references, as the mall picked up a new identity as "Natick". However, this name would be extremely short lived. By mid-January, controversy had begun to brew over the new name. Many feared that long term, confusion would grow between the town of Natick and the retail complex Natick. This was taken to the next level when the mall attempted to copyright its new logo which included the word Natick. In an effort to appease the town, the complex changed its name back to the Natick Mall on January 18, 2007." [http://framinghamnatickretail.com/natickmall/index.html]

The Natick Mall was chosen as a major example of sprawl development. Situated on Route 9 outside of Boston, this massive mall is a space devoted to consumption and entertainment. The site is surrounded by highway and accessed exclusively by car. Route 9 is a stunning example of the commercial strip. The Massachusetts Turnpike runs parallel to Route 9, about a half-mile North. Although caught in the endless expanse of post-Boston sprawl, the Natick Mall is almost a node. This architectural project aims to enhance this quality of the site and provide a suburban civic core for the region.

Interestingly, a number of residences are being built on the mall grounds. Condominiums will be opening early 2008. The mixed-use of the site calls for some public space. Although the developers would like to argue that the Mall is that space, this project will provide an alternative, open-air public space. This is not far from the vision of Victor Gruen, architect of Southdale Mall, one of America's first enclosed shopping malls.

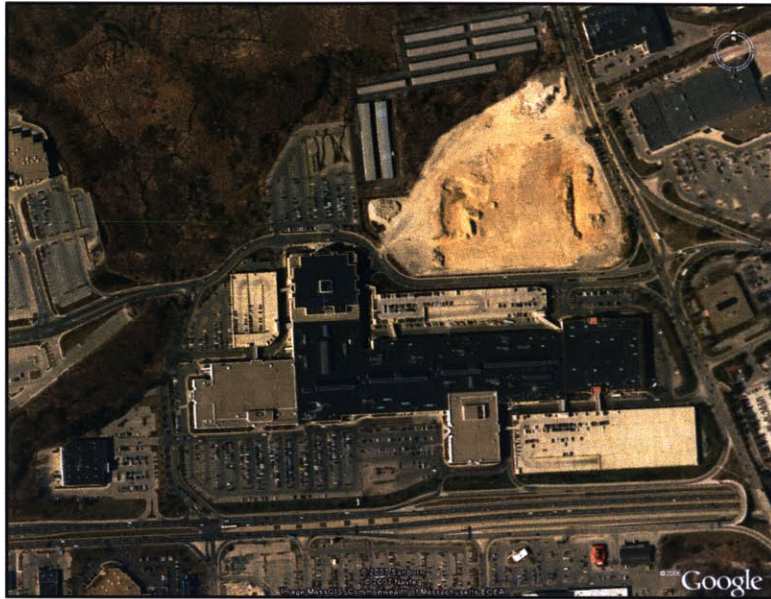


Fig 3.2.3
Site of the Natick Mall:
The Southeast parking
structure along Route
9 was chosen as the
site for the architectural
intervention



Fig 3.2.4
View to the North from
the roof of the Northwest
parking structure: sprawl
vista

"When Gruen first drew up the plans for Southdale, he placed the shopping center at the heart of a tidy four-hundred-and-sixty-three-acre development, complete with apartment buildings, houses, schools, a medical center, a park, and a lake. Southdale was not a suburban alternative to downtown Minneapolis. It was the Minneapolis downtown you would get if you started over and corrected all the mistakes that were made the first time around. "There is nothing suburban about Southdale except its location," Architectural Record stated when it reviewed Gruen's new creation." [Gladwell]

In light of these developments it is not too far fetched to imagine a public park on the site of a shopping mall. Even if it remains a speculative design, this project is intended to provoke a desire for public spaces in similar situations.



Fig 3.3.1
Citgo Sign.
Now a landmark and an icon
for the city of Boston. It has
transcended its initial role as
advertising.

3.3 Project-Specific Precedents

3.3.1 Signage and Spectacle: Citgo Sign

Now a city landmark, the Citgo sign originated as a commercial sign in 1940 and took its current graphic look in 1965. Although it is designed to function as advertising, the Citgo provides a organization node in the city, orienting people on foot and in car. As a backdrop to the Green Monster of Fenway Park, the sign is tied to city's beloved baseball team, the Red Sox. The size, form and design of the sign is unique. It cannot be confused with other advertising within the city, and features on postcards and iconic views of the skyline. The Citgo sign is rooted in consumer culture but has come to represent much more. It has become a sign for the city of Boston.

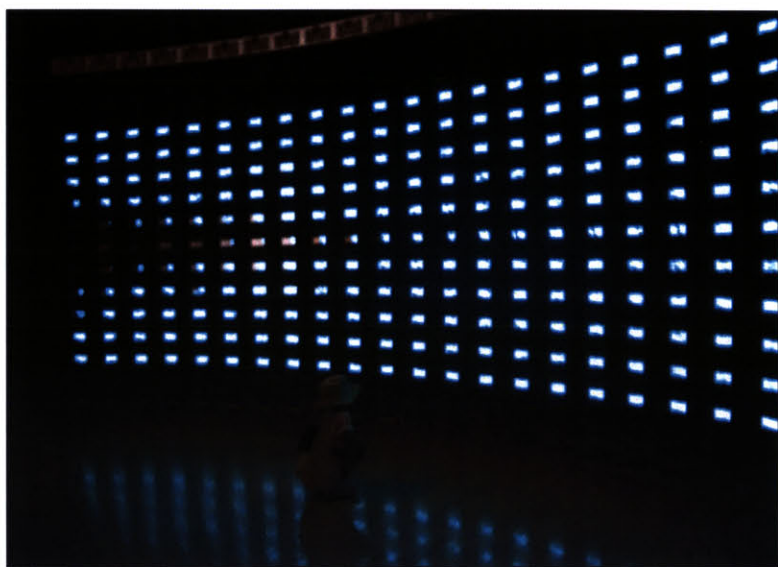


Fig 3.3.2
Listening Post
An indeterminate monument
to the voices of virtual
communication

3.3.2 Pluralist: Listening Post

The interactive art installation by Mark Hansen and Ben Rubin presents the audience with an immense collection of text gathered from Internet chat rooms, bulletin boards and public forums. These texts are curated into small performative modes, and presented to the viewer as snapshots of the ideas and desire of the inhabitants of virtual communities. Two hundred small digital displays are physically connected into a wall of real time communication.

*"Dissociating the communication from its conventional on-screen presence, Listening Post is a visual and sonic response to the content, magnitude, and immediacy of virtual communication."
[from the Ear Studio website]*

This public in this piece are all users of digital technology but this does represent a huge portion of the American population. It is important to note that the young and affluent are represented disproportionately in any work that draws upon the Internet for its material. This piece clearly states that it is a representation of virtual communities, which are only a subset of the population. Representing the opinion of the public always depends on whose opinions you have access to.

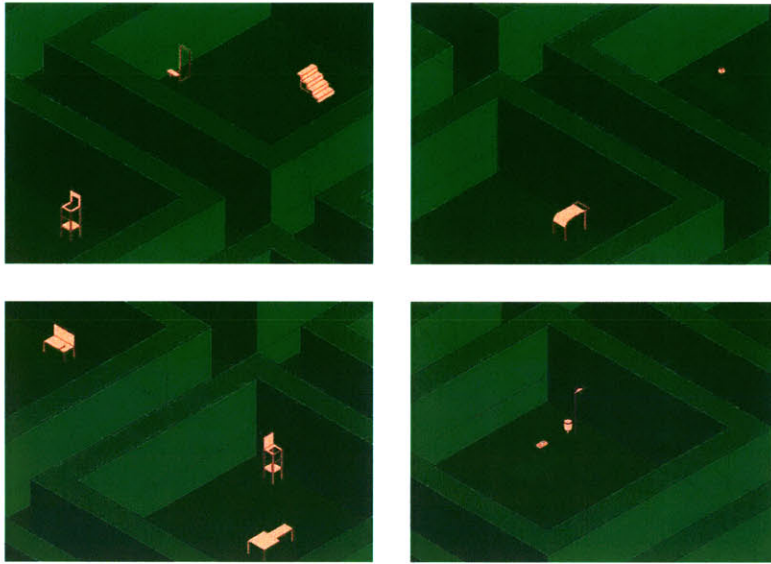


Fig 3.3.2
Park Interactives
Indeterminate physical form
that strays from conventional
ideas of public furniture in order
to encourage illicit behavior

3.3.3 Participatory: Park Interactives

The design firm of Dunne & Raby proposed a collection of provocative park furniture for the gardens of the Villa Medici. The design of the furniture offers a suggestion of how these room-like spaces could be used. There is an intended ambiguity in each piece and the hint of illicit behavior. The design is meant to challenge our desire for safe, user-friendly objects, especially in public settings.

"There is a slightly idealistic dimension to this project, as the objects we are proposing belong to a society where local councils provide amenities for adults, attached and single, to meet and play. We are also interested in whether the public can be encouraged to mis-behave when confronted with furniture designed to support illicit activities. The sketches are diagrammatic and still evolving, they are the beginning of a conversation." [from the Dunne & Raby website]

This project uses indeterminacy to allow for multiple readings of a static physical object. Dunne and Raby insert ambiguous furniture into the ordered rooms of the garden and by doing so transform them into interactive, participatory spaces.

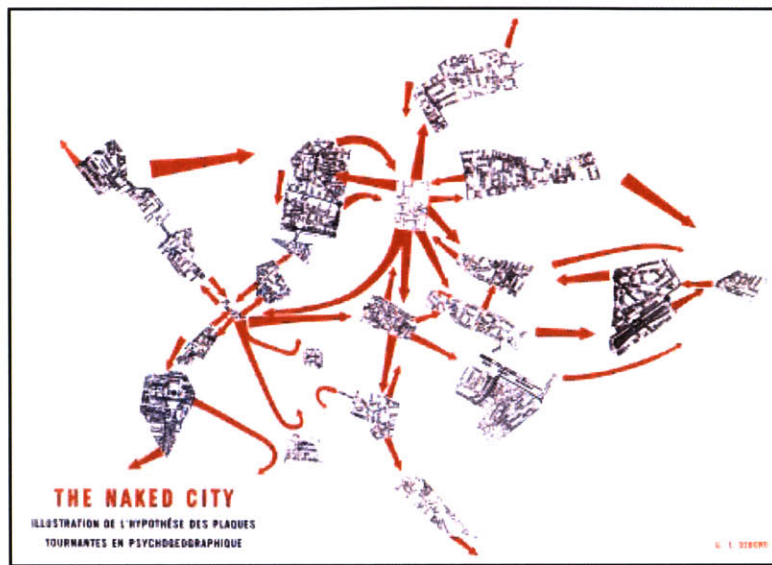


Fig 3.3.4
Naked City
This psychogeographical map
is the ultimate representation
of the Situationist concept of
dérive.

3.3.4 Participatory: Naked City, by Guy Debord

The Naked City is the title of Guy Debord's famous psychogeographical map of Paris. Debord cut up the ubiquitous Plan de Paris and arranged these fragments in the spirit of the *derive*. Each neighborhood forms a node, connected to other through a series of potentials, illustrated by large red arrows. Debord composed a number of these maps, each challenging the map as the definitive structure of the city.

"The Naked City denies space as context and instead incorporates space as an element of social practice. Rather than a container suitable for description, space becomes part of a process: the process of 'inhabiting' enacted by social groups." [McDonough p252]

The map contained in The Naked City requires participation. In it, the city does not exist as an objective, fixed reality, but as a subjective, fluid entity. This map is the visual representation of the *derive*, and points to a personal understanding of space.

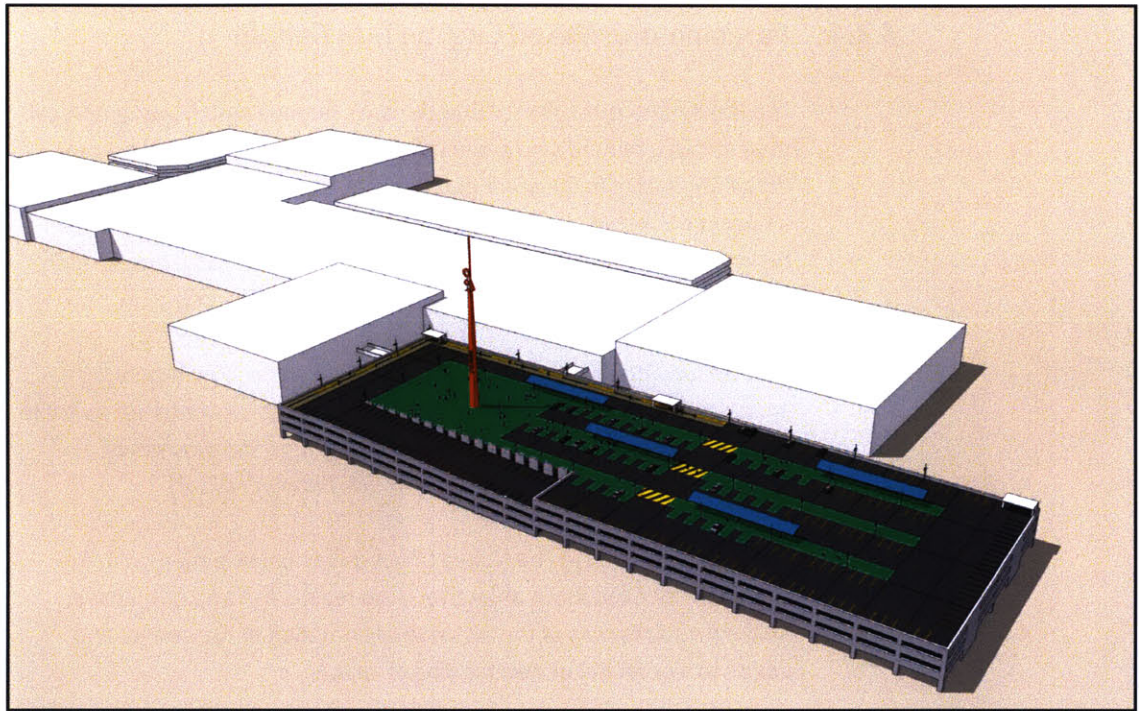


Fig 3.4.1
The roof of the parking
structure becomes a stage for
Indeterminate spectacle

3.4 Proposal

The site of the Natick Mall becomes the stage for a new kind of public park. An additional floor is added to the parking garage and the surface is programmed with both green park and asphalt parking. Piercing this horizontal configuration are three interventions: a field of radio masts, canopies composed of photovoltaic panels, and an icon broadcast tower. The radio masts form a spatio-temporal sound installation while the tower serves as a dramatic icon and broadcasts the experience of the soundscape to the surrounding region. The entire installation is powered by the photovoltaic canopies.

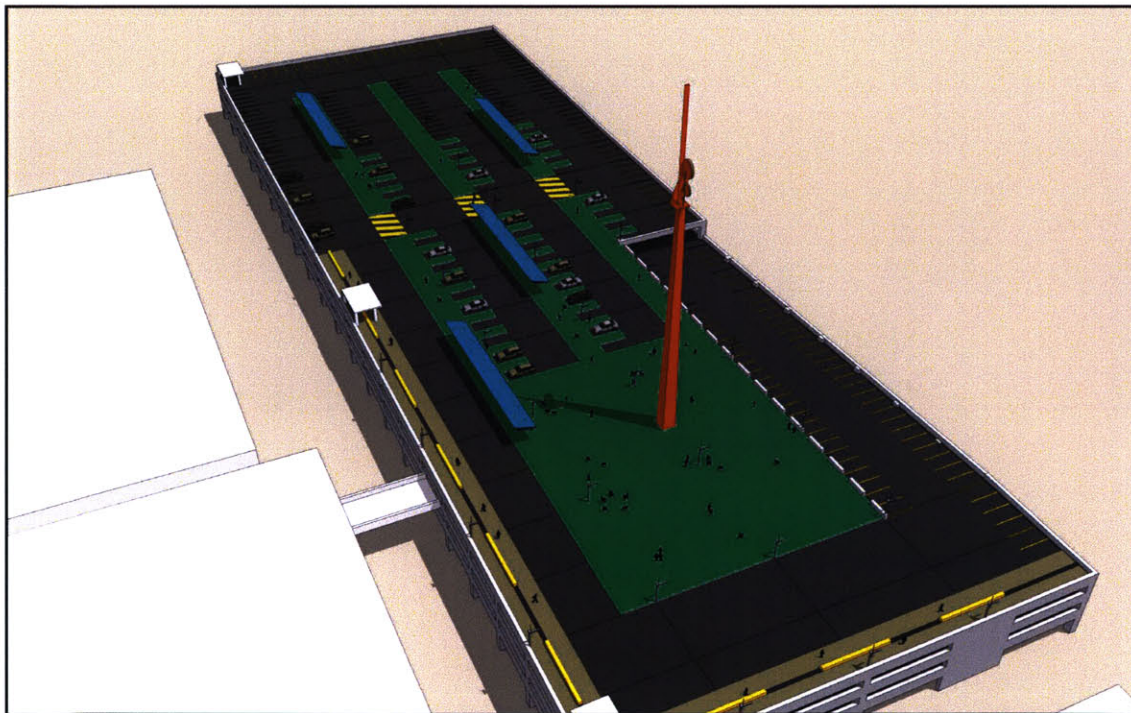


Fig 3.4.2

The broadcast tower becomes
an icon, orienting the visitor
within sprawl

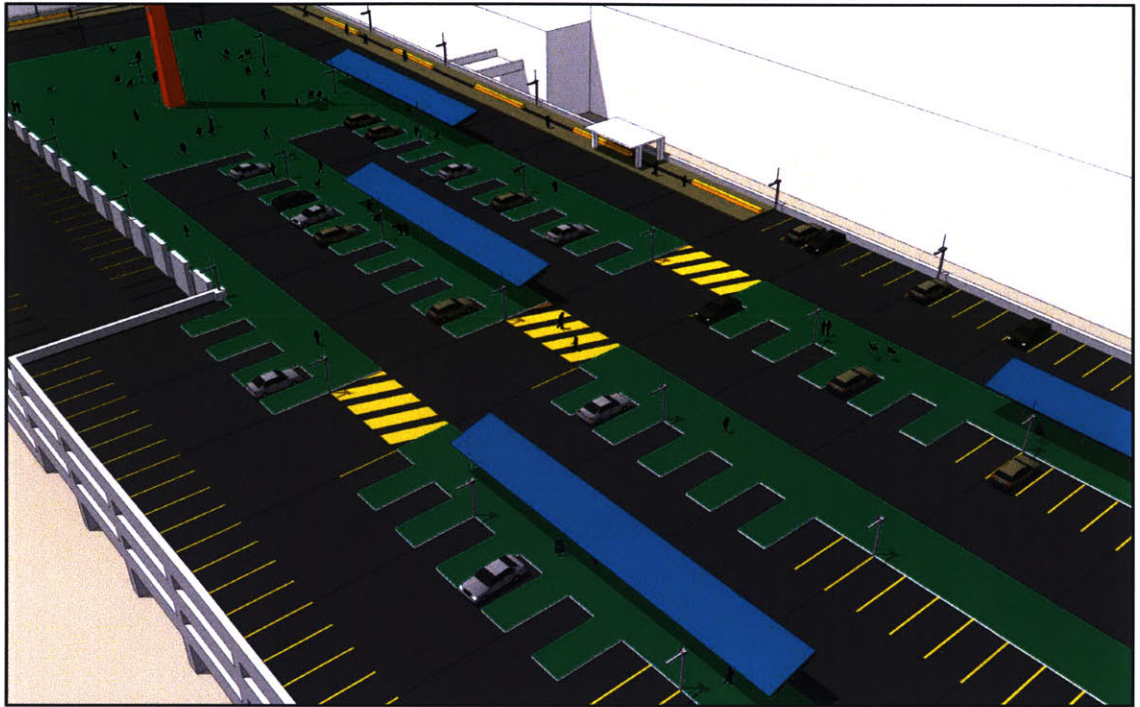


Fig 3.4.3
Photovoltaic canopies power the
site and provide shelter from the
elements.

A collection of radio masts form a soundscape where each device is recording and playing sounds and samples in networked composition. This field of masts form a three dimensional audio composition generated in real-time. A specific audio recording is associated with each mast, allowing it to present a curated experience alongside the networked and sampled composition. Human voices in all forms move through the site, becoming atmospheric at times and then crystallizing into legible transmissions.

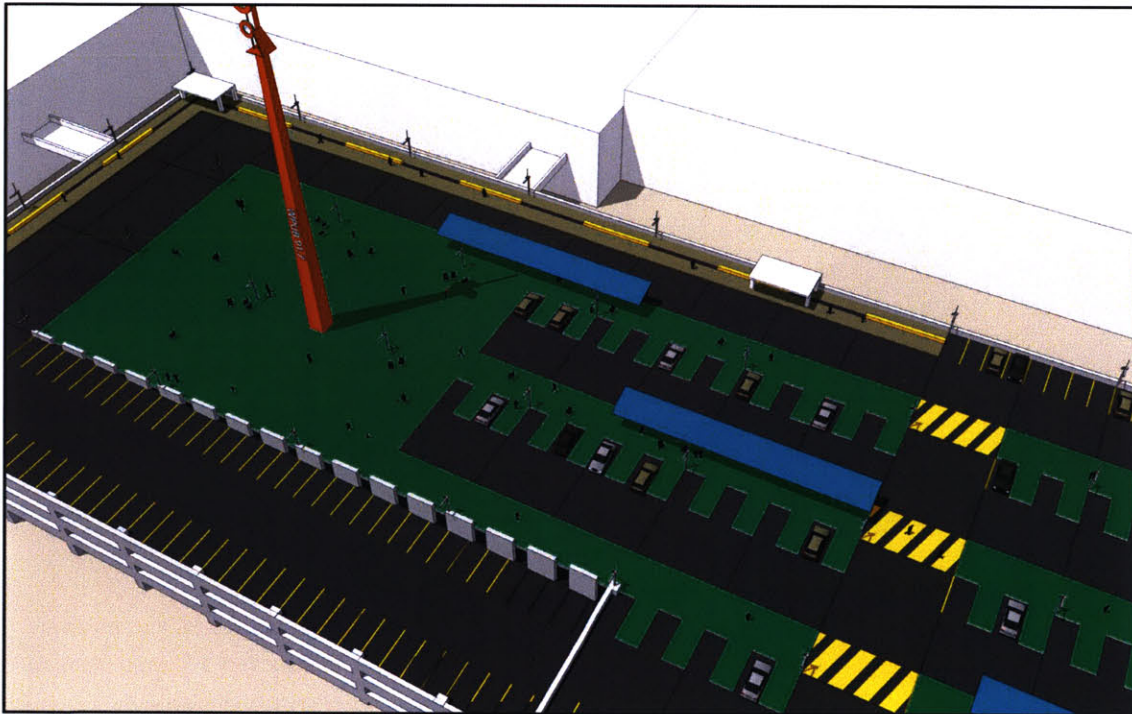


Fig 3.4.4
Radio masts form a
soundscape, recording samples
from the site incorporating them
into a networked composition

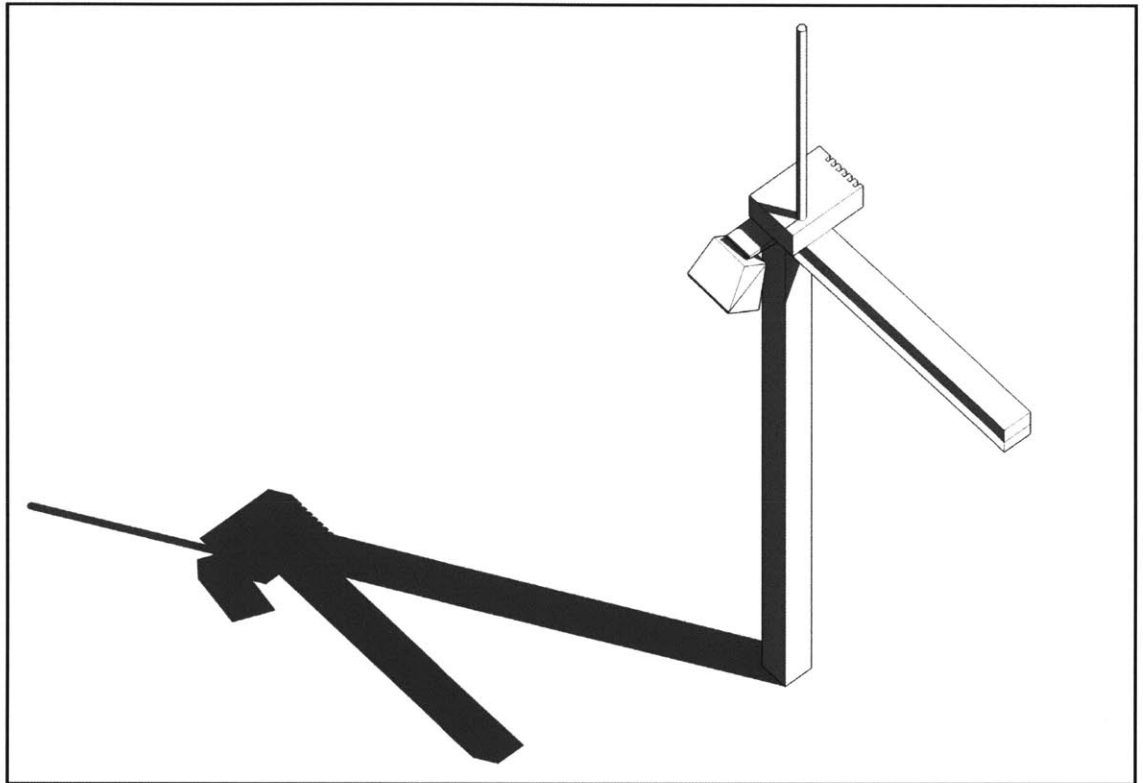


Fig 3.4.5
The radio mast is the essential
architectural and computational
element of the project

The radio masts broadcast their sound with localized FM transmitters so that cars moving through the site can tune into the speakers. In this way, the public installation passes into the personal automobile. The soundscape and the park are designed as a pedestrian interface to the mall, and attempt to publicize the transition from the scale of the automobile to the scale of the pedestrian.

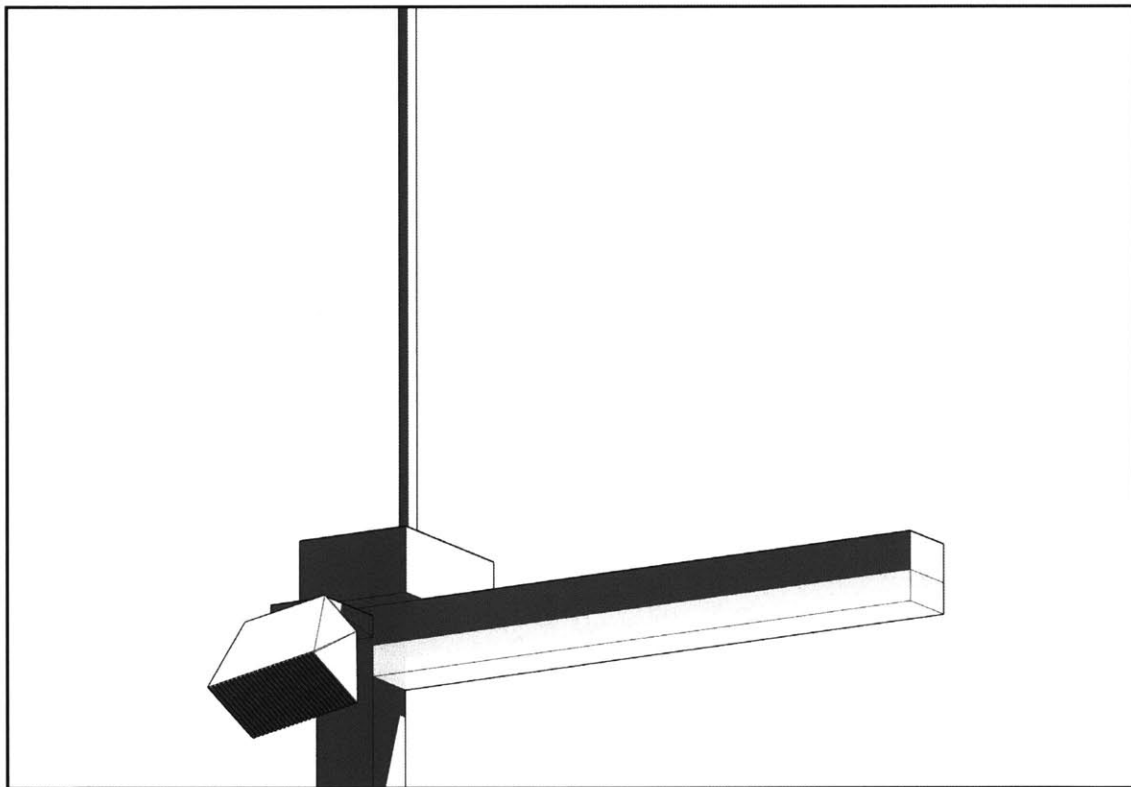


Fig 3.4.6

The radio mast is both a light fixture and a part of the networked composition. Each contains a microphone, speaker, and FM transmitter.

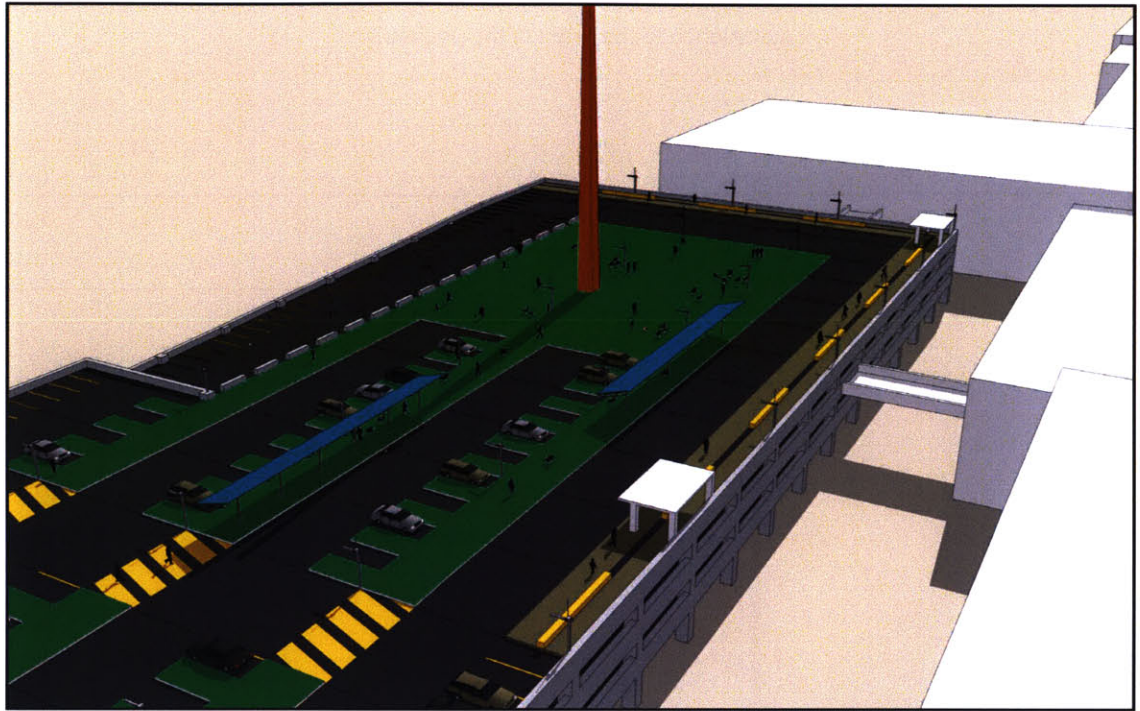


Fig 3.4.7
Aerial View to the West

The ultimate goal is to bring sounds, both ambient and spoken word, into the parking garage and distribute these samples throughout the space in parallel. The space will be filled with these point sources of sound, and they will be playing back both live and sampled audio. Within the space you can also leave audio traces. The site is continually changing and growing, incorporating the past, and returning to the curated sounds of the masts.

This installation is concerned with a non-hierarchical exchange of idea and opinion and the richness of sound as a medium for personal expression. The towers serves as a sign, allowing you to orient yourself within sprawl. They become a spectacle that combined with the sound installation, brings energy and life to the park with the hope that it becomes a suburban civic core. Even when empty, the site is full of sounds and voices, the traces and opinions of the public.

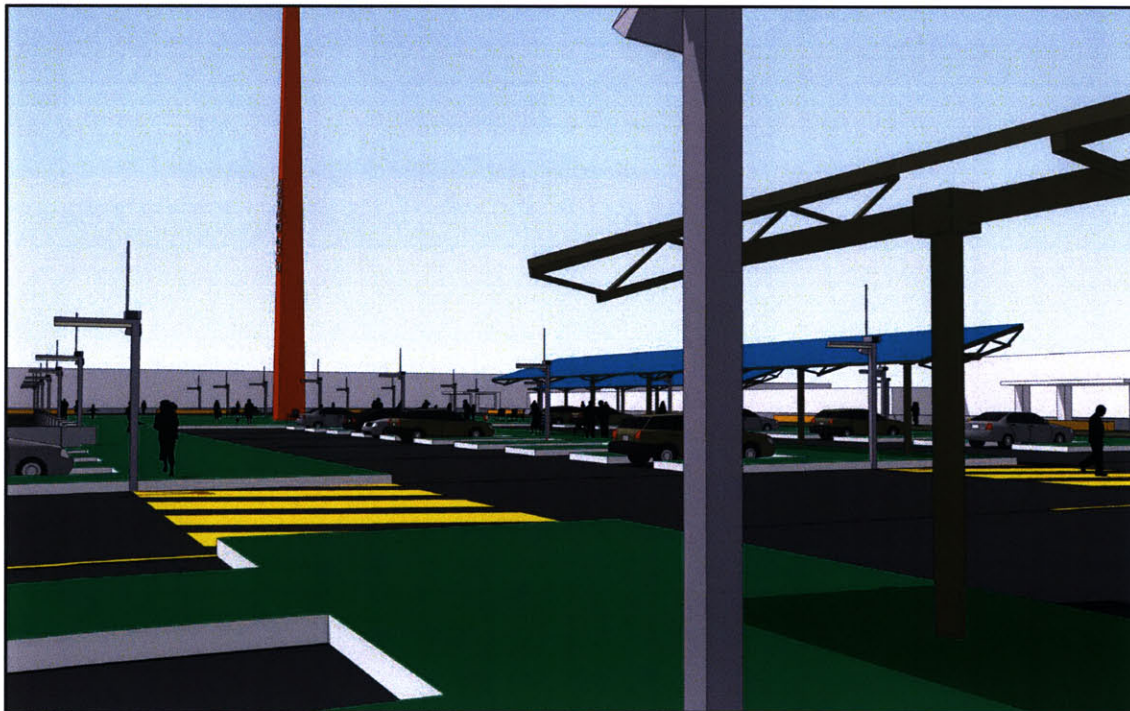
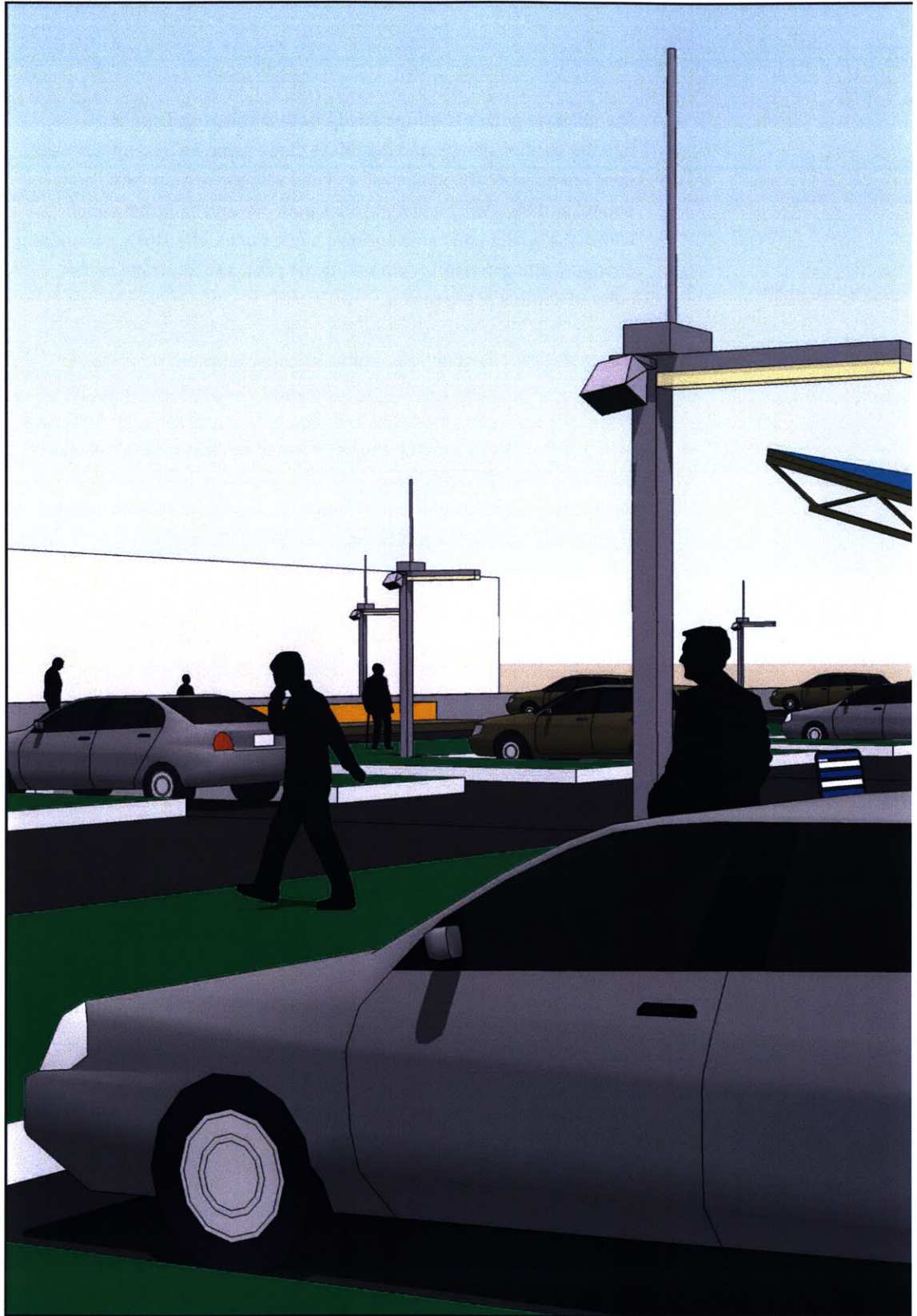
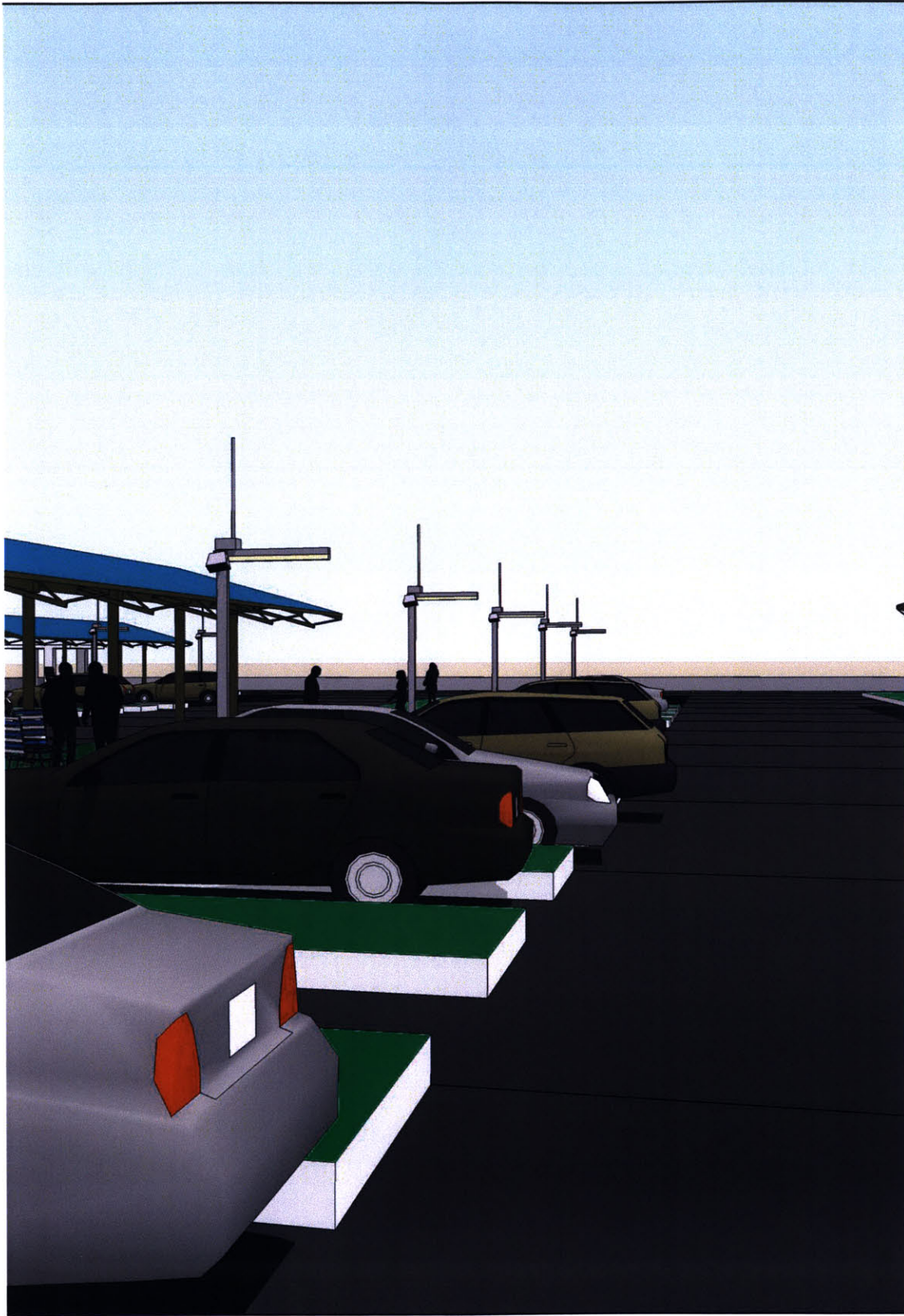


Fig 3.4.8
Perspective to the West





3.5 Design Analysis

Signage

The large broadcast tower serves as an icon that can be seen from beyond the site. Designed to be both technocratic and bold, the hope is that once it has been seen from the park it will function as a landmark, orienting you within sprawl. Additionally, the tower broadcasts the sound experience to a region far beyond the physical confines of the site. The soundscape itself is meant to serve as a spectacle. It is designed to bring energy and excitement to the site even when the space is otherwise empty.

Pluralist

By gathering radio from across the globe and recording audio at the site, the project aims to capture a diverse selection of ideas and opinions. It hopes to provide an image and recent history of the site and the world beyond. From within the project, visitors are linked to each other and to communities beyond the site.

Participatory & Personal

The active visitor can begin to speak directly into the radio mast, and intentionally leave messages, ideas, and opinions at the site. The composition requires a movement through the park, but doesn't prescribe a path through the space.

An alternative to private commercial space

The park is set on Mall property and will no doubt be regulated by mall security, but it is open-air and exposed to the elements. The parking lot is considered the most public space in sprawl, and the hope is that this park provides an alternative to the entirely commercial space within the Mall.



Fig 4.1.1
The soundscape consisted of a central computer, eight speakers on aluminum stands, and two suspended microphones.

4 Physical Installation

4.1 Concept

A smaller physical installation was constructed, programmed, and installed into an interior space in order to present the technical and compositional ideas behind the larger soundscape. This installation was a translation of the public park to a more intimate, enclosed scale. It was designed with the same principles as the larger intervention but the details were site-specific.

A single computer controlled a sound application with two microphone inputs and eight speaker outputs. The microphones were hung in the space. Aluminum stands were fabricated for each speaker, with the speaker pointing upwards at a height of eight feet. These speaker posts were arranged in a 2 by 4 grid, with a spacing of 8.5 feet by 14 feet. These eight locations were spatially modeled in software so that speaker's location became part of the composition. In order to render sound to eight channels simultaneously, a M-Audio Delta1010LT hardware card was installed into the computer. Using ASIO drivers, audio could be captured and sent to 8 input and 8 output channels simultaneously.



Fig 4.2.1

The speakers pointed upwards at a height of three feet. The audio signal was fed from a multichannel sound card into an amplifier and then into the speaker.

These speakers and microphones formed a networked soundscape, generating audio in real-time. Live radio, streaming over the Internet was included as a compositional element, with a different radio station associated with each speaker. These radio stations were chosen to be spoken word in nature and as diverse as possible. They included public radio, sports, right-wing talk shows, religious sermons, and live police scanner.

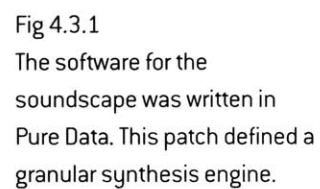
The soundscape incorporated these radio feeds as well as samples gathered from the site and composed for all eight speakers in unison. The composition was both spatial and temporal in nature. A score determined the global action while local differences alternated between speaker locations. In addition, the raw material was always unpredictable. This work used the score as an ordering principle, but remained indeterminate through the selection of source material.

4.2 Divergence from the Architectural Design

The soundscape as prototyped functioned differently than the park for a number of reasons. First, the space was interior. Interior surfaces reflect sound and the room was a chamber that contained the sounds of all the speakers simultaneously. The public park was designed in the open, with speakers at a distance such that only a small subset could be heard at once. The interior composition had to account for the fact that all the speakers could be heard from any point in the space.

Second, the setting for the prototype was private and within the confines of MIT. Almost all of the visitors to the space intended to see the work. There were few chance encounters. When the doors to the room were open, the soundscape would capture incidental sounds, but the goal of the public park is to capture these incidental sounds and layer them into the composition.

Additionally, the prototype did not explore FM broadcast of sound. There were neither cars moving through the space nor the distance between speakers required of such a system. These radio transmissions were an important part of the implementation in sprawl, but were redundant in an interior space.



4.3 Software Design

The core of the soundscape is a personal computer running custom software programmed for the installation. The software was written in Pure Data, designed by Miller Puckett for audio synthesis and composition. This is an example of a data-flow language. Signals and controls are routed through pipelines, much like an analog circuit. The programmer creates graphical patches and sub-patches as opposed to classes and objects. The patch itself is a graphic representation of the program.

The fidelity of the human ear requires that audio be rendered at 44100 frames a second. On the other hand, the human eye can only process 60 frames a second. The speed of the audio pipeline requires that signal be separated from control. This is not normally true of computer graphics applications. Pure data, known as PD offers a powerful way to program at the speed of audio, but is restrictive in terms of memory. A PD patch is a static set of connections, functions, and data arrays. A program written in C, on the other hand, can dynamically allocate new memory and clean up unused memory.

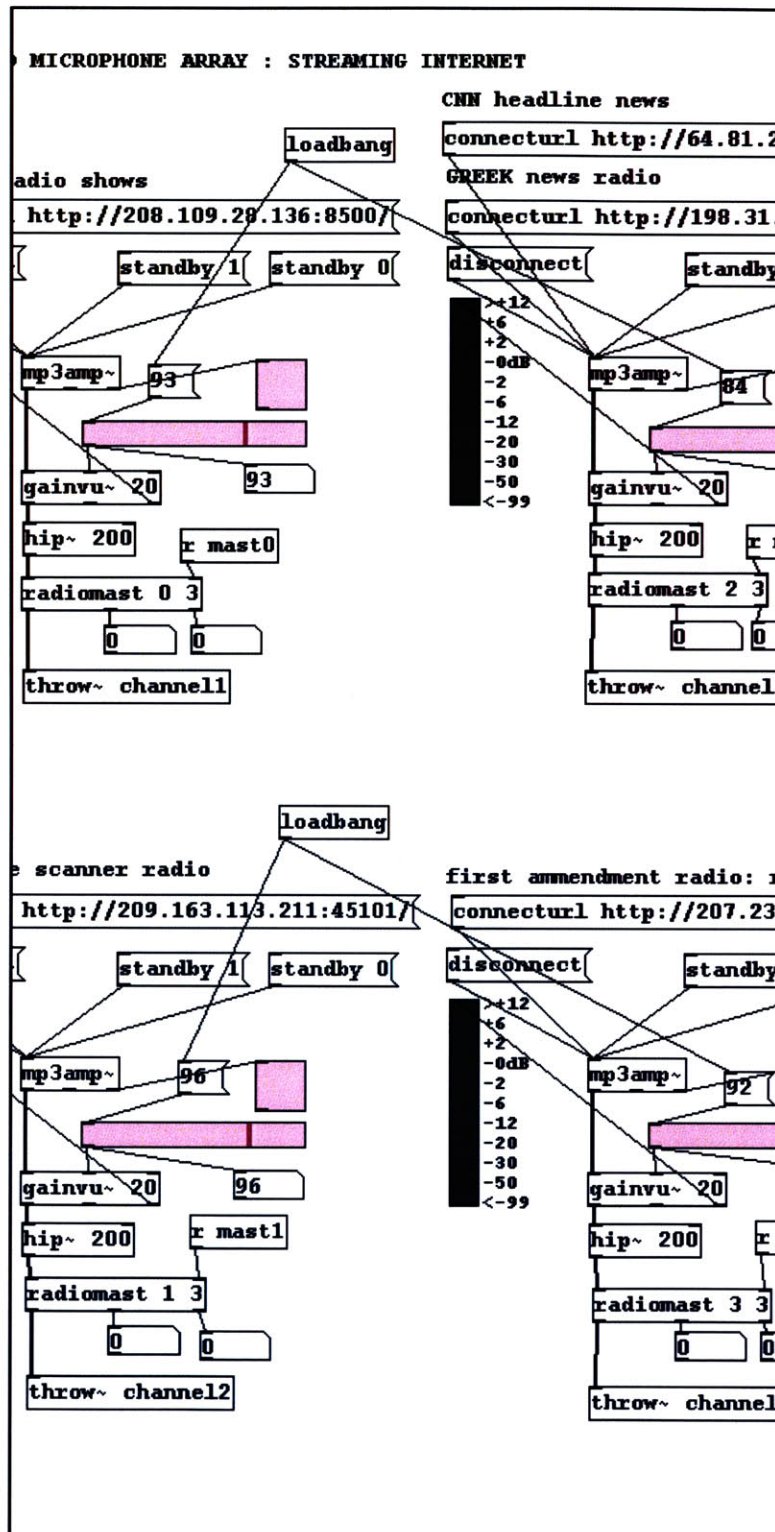


Fig 4.3.2
Detail of radio mast patch

Pure Data was chosen because it is convenient, powerful, and open-source. It is an ideal way to prototype computational audio. Objects can even be written in C and compiled to a PD patch. This installation incorporated five particular audio techniques.

4.3.1 Streaming Radio

All the radio feeds were streaming mp3s from ShoutCast servers. Eight independent stations were streamed into the PD app where they could be modified like any other audio signal. This audio was used to represent a multitude of simultaneous voices.

4.3.2 Live Sample Recording and Playback

The software used two microphones and a number of data arrays to collect audio from the site. At certain points in the composition, the software would listen to the mic inputs. If the signal strength crossed a certain threshold, the audio would be stored in these data arrays and written to WAV files. The software layered a number of previous samples in order to capture the recent history of the site. Additionally, the composition included prerecorded environmental sounds from a number of locations.

4.3.3 Spatialized Sound

The illusion of physical objects moving through the site and emitting sound was achieved through a spatialization algorithm. If each sound is associated with a x,y location in the room, the strength of the signal at any speaker could be calculated using an inverse distance squared relationship. The reverberation of the signal at each speaker changes at a slower rate. As detailed by Curtis Roads, these techniques give a close approximation to spatialization.

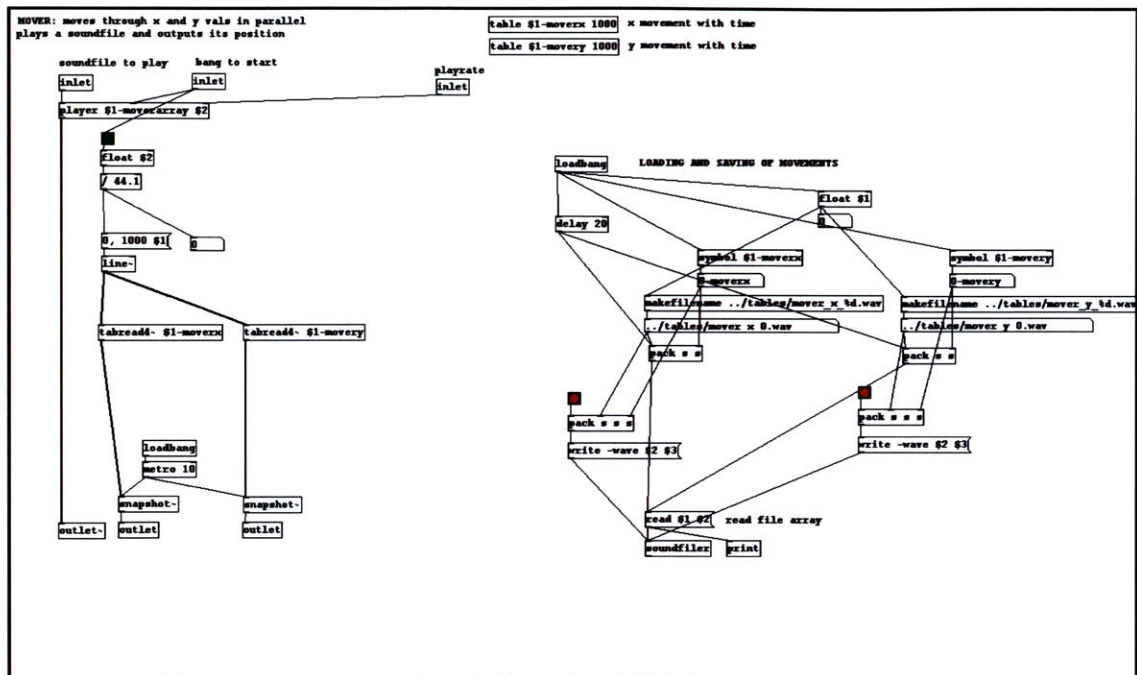


Fig 4.3.3
Spatialized audio patch
dynamically modulates the
volume of a sample at all
eight speakers and adds
reverberation to simulate
location and motion

4.3.4 Granular Synthesis

In Pure Data, all sampled audio is stored as arrays of numeric data. If this data is accessed linearly at the same rate it was sampled, the resulting output sound mirrors the original recording. Granular synthesis is a technique for the re-synthesis of data based on the playback of small chunks of sampled audio. These grains can be of a variable size and can be played back in any order. In the case of the soundscape, granular synthesis was used to create an ambient texture out of sampled audio.

4.3.5 Frequency-domain Synthesis

During the listening phase of the composition, a knockout filter, part of the FFTease library for PD, created a sequence of harmonics. These functioned as a background to the listening and aesthetically refreshed the space after a highly chaotic conclusion to the playback phase of the composition.

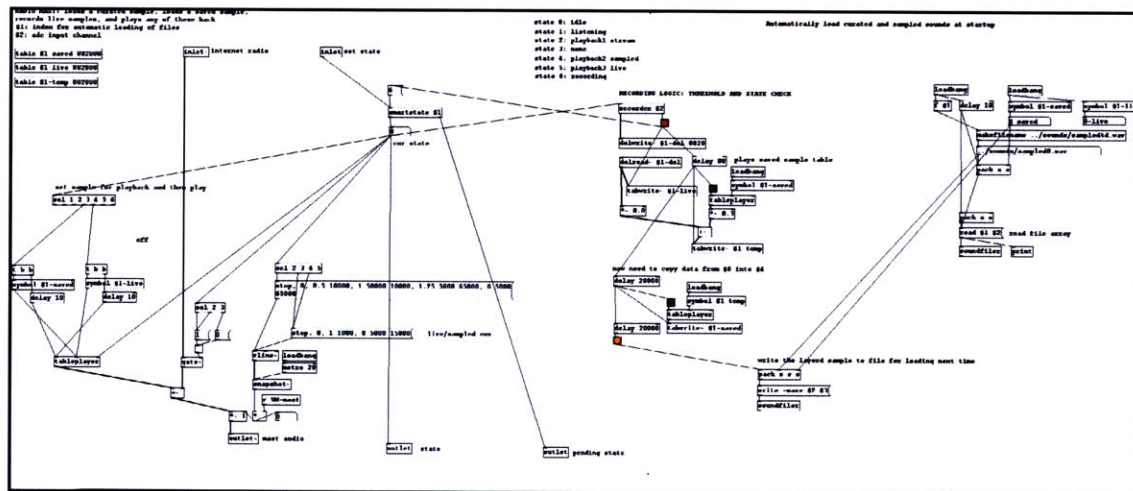


Fig 4.3.4

Radio mast patch manages the state of the mast, modulating the envelope around the streaming radio feed, recording samples, and saving the samples as archived files

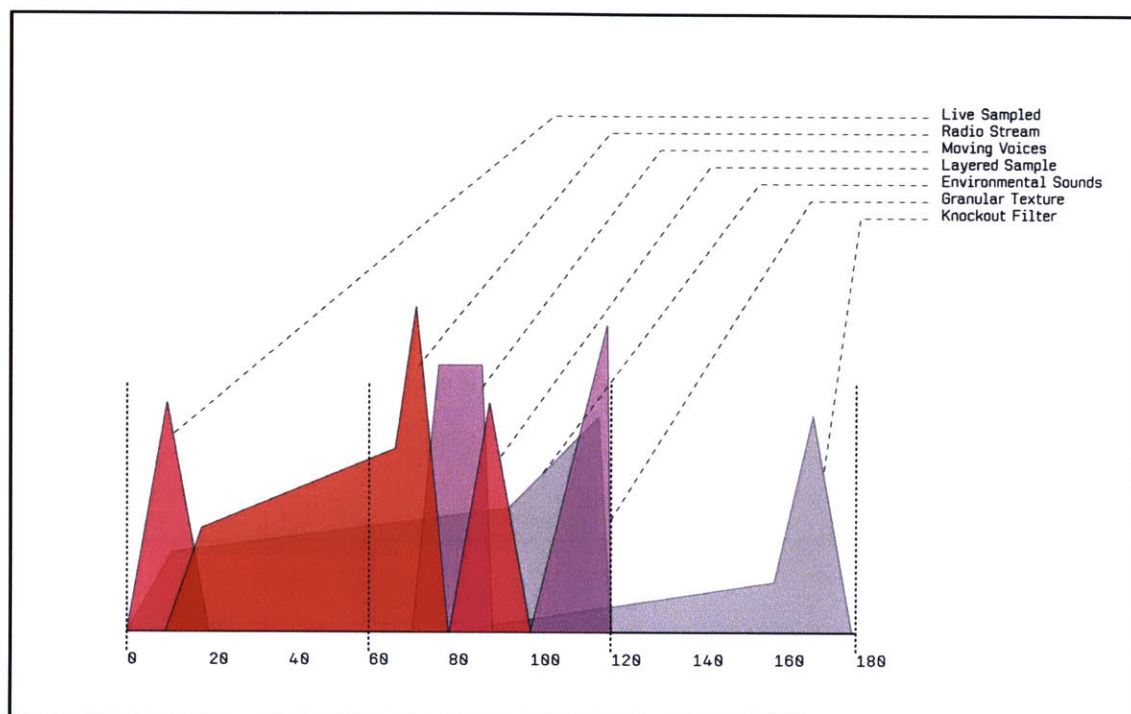


Fig 4.4.1
A score provided a periodic
regularity to the composition

4.4 Score

The score defined the audio composition based on a three-minute sequence of events. Each iteration of the score included elements of variation: the environmental ambiance would change, the configuration of audible radio streams and samples would shift, and of course, the content of the radio stream and sampled audio would be in constant flux. This balance gave the composition a periodic order, but within this period was indeterminacy and variation. The composition itself was inspired by John Cage's *Imaginary Landscape no. IV*, in which Cage conducts the operation of a number of radios. Like Cage, the soundscape application modulates the envelope around an audio source, but not the underlying radio signals defining the source.

5 Conclusions

This project demonstrates the development and implementation of a theory of public space in sprawl. The theory was based on historical and contemporary understanding of the conditions of sprawl, specifically consumer culture and the industries of consumption. The ultimate goal was to provide a platform for the perpetual conflict of interest in less than ideal conditions. A sprawl site was chosen and a public park was proposed for this site. The architectural design was founded on a number of computational elements: infrastructural hardware that functioned to define and enable public space. The hardware used sound as expressive architectural material. In order to demonstrate the ideas behind the architectural design, the architectural hardware was prototyped at a slightly smaller scale and installed into an interior space of the MIT campus. This hardware formed a site-specific soundscape: programmed, scored, and presented to a live audience. The soundscape was a live demonstration of the technical and aesthetic principles of the architectural design.

Indeterminacy

Our theory of public space in sprawl is titled Indeterminate Liberal Form, and the cornerstone of this theory is the use of indeterminacy as a technique for responding to the homogenizing influences of commercial culture. Computational media is uniquely positioned to take advantage of indeterminacy, and therefore this project was implemented through computational architectural hardware. The emphasis of the work is that indeterminacy allows for a flexibility in the performance of public space. It is important to note that indeterminacy relies on ranges and probabilities. The design is not fixed or certain, but at the same time it is not random. This balance between order and entropy defines indeterminate public space.

Sound as an Architectural Material

This project explored a number of techniques for using sound as a spatial and sculptural design medium. Although architects consider the acoustics of their designs, they rarely incorporate original sound design into the architectural process. In the case of this project, sound was used as an expressive medium for representing a diversity of opinion, but there are countless possibilities for original sound compositions within architectural design.

Limitations of Current Implementation

The site for the physical soundscape was determined by a number of campus restrictions. It was not deliberately chosen for its similarity to the architectural setting. Because of this there were a number of limitations of the physical setting. First, it was not public space. People did not unintentionally pass through the installation, rather they chose to enter the room and engage with work. Ideally the prototype would be set in a public location so that it could capture incidental sounds and intersect the paths of the public. Second, the space was interior and the speakers were tightly packed in relation to each other. This required compositional techniques that were somewhat different from the expansive open-air architectural site. The soundscape as prototyped demonstrated all of the concepts and techniques of the architectural project but at a different scale and color.

Future Directions

After prototyping the soundscape, the hope is that it can be installed into an expansive public space as a first step towards implementing the larger architectural project. The finished hardware from the soundscape could be set in a large semi-public interior space, such as a hotel lobby. There might even be sprawl locations well-suited to the soundscape in its current format. This would be an important first step in the development of an open-air permanent version of the project.

Future Theory

The architectural design and physical soundscape are only two examples design based on a theory of Indeterminate Liberal Form. This theory provides techniques for creating public space in locations and situations that seem at odds with such idealized use. The goal is that designers will begin to embrace the aesthetic techniques of this theory in order to provide alternatives to private commercial space. As sprawl becomes the contemporary reality for more and more of us, it becomes essential to understand the implications of this space and find ways to democratize the otherwise totalitarian landscape.

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